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THE PHILOSOPHER

who rose above the fish and chips shop of his birth

By DIANA THORNE

Illustrated by the Author

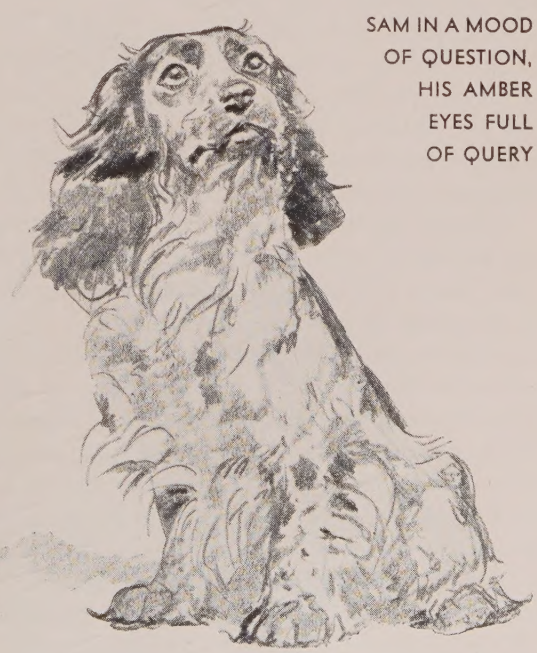
SAM, the spaniel, stopped at the gate, left forepaw uplifted, forehead furrowed, an absent and worried look in his amber eyes. Up and down the arterial road the morning traffic was fast and continuous. The sidewalk resounded with the patter of feet hurrying to work, a sound with which Sam was as familiar as the hazards of crossing the streets, or of threading through the pavement crowds at lunch hour. Sam was a city dog, and he knew how to take care of himself.

The morning was young. Smells of inviting and intriguing character—old, familiar smells mixed with new-ones—reached Sam's twitching nose, but for once he postponed an investigation. He felt bothered and impatient. He was trying to recall something he had noted yesterday to be remembered today. What was it, now? It must have been something important, something vital to his contentment, or he would not feel so annoyed. Was there a meeting at the new dog club behind the newsstand? Had he planned a trip to the window of thoroughbred puppies on the Avenue? A call on Buster Hanley, who had broken his leg? No, none of these. They were routine matters. This was something special. Sam settled down comfortably on the sidewalk. This needed thinking about.

Sam was an opportunist, and worldly. He knew it was foolish to spend his life on little things; but he knew, too, from what small details many an important circumstance evolves.

Sam's visiting list was extensive—greater than that of any dog he knew, probably greater than that of any dog in creation. He was the first to admit this startling fact, for he was not modest. His popularity precluded any fostering of a virtue he did not particularly appreciate. A visit from him was, he knew, regarded as a compliment; to many of his friends he was veritably a Pippa. He passed by with a nod or bark or wag of tail and all was well for the person who saw him. He was an important character in his district, and what was the good of pretending he didn't know it?

Scratching one ear meditatively, Sam pondered. He liked life; he had found it amusing and pleasant. True,



SAM IN A MOOD OF QUESTION, HIS AMBER EYES FULL OF QUERY

SAM IN A VARIETY OF POSES. HIS MOODS WERE MANY, TESTIMONY TO AN ACTIVE MIND WITH A BACKGROUND OF WIDE EXPERIENCE

living in the country, where squirrels, rabbits and rats abounded and where one could hunt freely, had certain advantages over a city life; but he knew that if he did live in the country he'd probably wish he were living somewhere else. He had often met, on vacations with the old lady who cared for him (or, more accurately, whose home he used for lodging quarters), countryside dogs. Not many of them, he recollected, had been satisfied. Indeed, they had envied him; and Tim and Benny, the Danes, had even tried to follow the old lady and him back to town, running beside the train as long as their breath lasted.

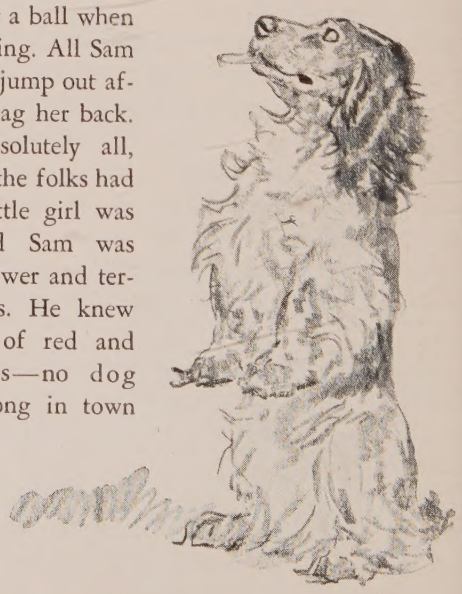
Sam sighed. A thinking dog could understand much, but much, too, remained a mystery. There were certain phenomena, like why birds could fly and he could not, over which he puzzled but never solved. Well, humans, too, worried over Mysteries, and Sam felt sure they knew, in the end, little more than he.

There was lots of time this morning; he could feel it all around him. The shopkeepers were still preparing for the day, polishing windows, sweeping the pavements, taking down shutters. He could afford to think a while longer about the lost thread in the fabric of his day's plan.

Long ago, dim in his memory, was his puppyhood. The sole survivor of a litter claimed by distemper, Sam had no clear picture of his brothers and sisters or parents, nor of the period of his emergence to doghood. All he recalled with any distinctness was a smell, recurrent and persistent—the peculiar and pungent odor of the Fish and Chips shop in Brighton, at the back of which he had first seen light and faced a world of frightening, monstrous shapes and sounds. An orphan, dog or human, must be self-reliant. Sam was that from the day he opened his eyes to his mother's patient licking. He had known no fear. He was inquisitive. He was thoughtful. He had made his own way against odds by force of character. This was Sam's belief, and it was probably true.

There had been, naturally, some lean days and some sorrowful ones. That was to be expected. He knew not all bones had marrow. He had never, however, suffered the privations he had known other dogs to endure. No, in reviewing his life, he could find nothing about which to be self-pitying. His present position, for instance. It suited his temperament and desires perfectly. He could not have endured a kennel existence. Nor could he have endured a more sheltered life, one governed by a leash, with a diet of fine food in exchange for individual freedom. True, the possession of a motor car was desirable; his old lady had none, poor dear. That was a pity. He had discussed the matter with a certain wealthy dog, however, and found the fellow overbearing and stupid in his possessiveness. Perhaps car-ownership made you like that; was a bad influence. Whatever the merits or demerits, it was a grand feeling to stick your head out of the window, to see the ground rushing past under you, to feel the wind and a swiftness of motion far beyond what your legs could achieve and as near as one could come to flying. Still, he felt no severe loss in not having a car. He had tasted the sensation, and that was satisfying enough.

And he had been of use. Oh, yes, of decided service. That was a pleasing thought! Sam well remembered the occasion of the Rescue, because of the fuss that had been made over him. A stupid fuss, and awkward, for he had had so much to eat afterwards and so much petting that he had been made ill. He recalled how he had balked, successfully, at wearing the large, round, silver thing they put on his collar (a brand new collar) and which they had expected him to wear—he, Sam, a democratic dog! The little girl had run out into the street after a ball when a car was coming. All Sam had done was jump out after her and drag her back. That was absolutely all, and how silly the folks had acted! The little girl was innocent, and Sam was wise in the power and terror of wheels. He knew the meaning of red and green lights—no dog would live long in town



if he didn't. The child knew their meaning, too, now. She was a nice child. Sam loved to play ball with her.

Then there was the queer case of the burglar at Mrs. Smith's. Sam had gone on that day, as usual, to the Smith house. A call there was part of his routine in those days. She had a smile and a cake and a cup of milky tea for him whenever he came. That afternoon Mrs. Smith was not visible, but her door was open. Sam had gone inside and barked at the foot of the stairs. Perhaps she was upstairs. He waited in the hall. He always waited for what he wanted. Then a man came in through the open doorway. He did not see Sam, and he did not look or behave like Mrs. Smith's friend. He was furtive and too quiet. He took down coats from the hall rack—THREE coats! Sam wondered what any person wanted with three coats. The man went outside, looked about him, and began to run. Then Sam, who was following and sniffing, felt sure something was wrong; he ran beside the man and in front of him, and he tripped him up and bit him and the man dropped the coats and a policeman came up and said,

"Hello, Sam, what's all this? What have we got here?" There was a great fuss. Mrs. Smith got her coats back and people everywhere patted him. It was very exciting. Mrs. Smith tried to get his old lady to let Sam live with her, but neither Sam nor the old lady saw any sense to that.

SAM KNEW THE NEED OF NEW FRIENDS IN A CHANGING CITY

His old lady now had quite a number of shiny round things which had been presented to Sam and which she liked to show to company. Sam didn't mind, if it gave her pleasure. He took no interest in these shining objects himself, for they could neither be eaten nor played with.

Aha! Sam lifted his head. He now remembered. He had noted last night that a call today at No. 22 in the Crescent was a shrewd move. That was it! He had made a friend there. The cakes were particularly good and the tea superior. Twenty-two undoubtedly offered possibilities. Anyhow, Sam had given his bark that he would again call soon, and why delay? He always kept his promises. Besides, one had to make new friends. City people had a way of mysteriously disappearing. One had to expect that, he supposed, though it was very disconcerting to wake up on a fine morning and find them gone; and refreshments, too. That was why it was important to accept every chance to make new friends. One never knew what possibilities they held and, while there was always the risk of disappointment; life is like that.

THE FUSS MADE OVER HIM WHEN HE CAUGHT THE BURGLAR HAD HAD ITS RARE MOMENTS

Sam licked his lips, shook himself well and, tail wagging, eyes gleaming, a happy expectancy pervading his mind, he trotted down the street.

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WHISTLING SWANS

AT HAWK MOUNTAIN SANCTUARY

By ROSALIE EDGE

The flight of swans in fluent script
  Wrote singing psalms across the sky;
In changing forms the rhythms flow'd,
  As wingèd words of truth sped by.

I craved to see the Writer's face,
  Aflame in clouds above the fen;
The sunset glory of His sleeve
  Fell from the hand that held the pen.

The Vanishing Spice Pinks

By IAN THOMPSON SMITHERMAN

THE PRESENT generation of garden lovers owes the wild ancestor of the superb pinks of today a debt of gratitude. These old grass pinks, *Dianthus plumarius,* are not holding their own in the mad race for color and types.

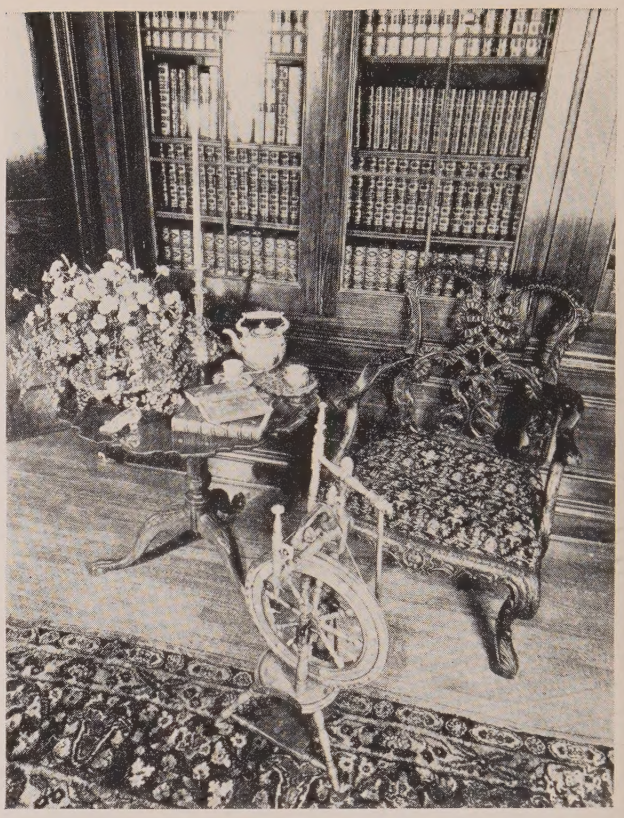
Even the loss of their most priceless heritage, perfume, has not caused much of a stir among the average gardeners. We spend a dime for a mixed package of *Dianthus* seed in the average shop and get about twelve varieties, and perhaps none of them will have a whiff of fragrance. But great as our gratitude is for so much beauty at such a pittance, we have no right to forget that favorite scented flower that was the pride of colonial gardens. When we ask about them in the midst of the splendid array of plants about the handsome estates, they seem but a mere memory to the one questioned.

John Burroughs tells us that the master instinct with every bee and blossom is to increase and multiply and fill the world with its progeny. As the vine and tree encase their seed in fruit pulp as a reward to lure man and small four-footed creatures to drop seed for scattering and planting, so are perfumes and bright hues a signal to insects.

It is well known that as soon as a flower is pollenized by the bee the work of the blossom is over and the lovely color quickly fades. Thus is explained why the flowers of the new types live longer on the plants because they have no fragrance to attract the bees. The demand for long life in the bloom of pinks is in special favor with rock gardeners since a rainbow of color over rocks is their first demand.

The reason our grandmothers had such success with pinks was that they used them for border plants and lifted their flower beds up high above the rest of the garden level in formal fashion. Gravel walks nearby assure perfect drainage after the heavy rains and burning heat of summer. Pinks have never disliked heat. Their worst enemy is root rot from poor drainage. A few handfuls of rock thrown up under the bush when a thick mat has been formed will constantly assure success when the brown scald begins to appear near the base. This always occurs right after prolonged rains and is found as often in winter as in summer.

Some of the authorities have the effrontery to list the grass pink under *Dianthus* as merely one of the children in that family. Nothing could be more incorrect. They should be listed as the parent of pinks, and present-day carnations as their culmination.



THE PRIDE OF COLONIAL GARDENS

The spice pinks, in years gone by, were an important part of the living room decorations, but today are forgotten in the race for riotous color

The spice pinks have an authentic lineage, that few would dispute, back to the days of the Roman Empire. They were known as Jove's own flower and were constantly used for decorations at the recurring festivals at the time of the full moon.

Even the *Dianthus plumarius* seed you buy is not so spicy as that from the old bushes that have been carried over in some ancient garden. There are still a few gardens that have remained just as they were handed down from before-the-war days. Cuttings from these with a heel or joint are most desirable and are easy to grow if taken at the end of summer months and inserted at least two inches under soil. Dirt should be packed about the base and a tiny berry basket turned over the young cuttings to preserve the moisture for a week or so until their roots get well started.

The old fashioned spice pink will never vanish from your garden if you give proper attention to drainage. And remember, the more cuttings you give to other people the more blossoms you will have for yourself later on.

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We are happy to announce that Wendell and Lucie Chapman return to our pages next month with a fascinating otter story. The Chapmans, you know, started to follow Nature study and photography as a hobby and made such strides in both fields that they are now actively sought by publishers for book material and by many organizations seeking speakers on wildlife subjects.

Crystal Tears of the Blue Ridge

Virginia's "fairy crosses" are a peculiar and charming geological relic

By HIRAM JEFFERSON HERBERT

YEARS AGO, even before King Powhatan reigned in that fair country now known as Virginia, the wood nymphs and the fairies were dancing and playing in a quiet sunny glade. Some of the sprites had come to a fountain to fill their jars with sweet water when a messenger approached. His face was weary; his manner sorrowful. He had journeyed far, all the way from Calvary, and sitting near the cool, musical splash of the fountain, he told of the Crucifixion of Christ. Upon hearing the tidings, the fairies wept. Their tears fell to the earth. There they were crystallized into small pebbles, and on each was formed a small cross of startling beauty and form.

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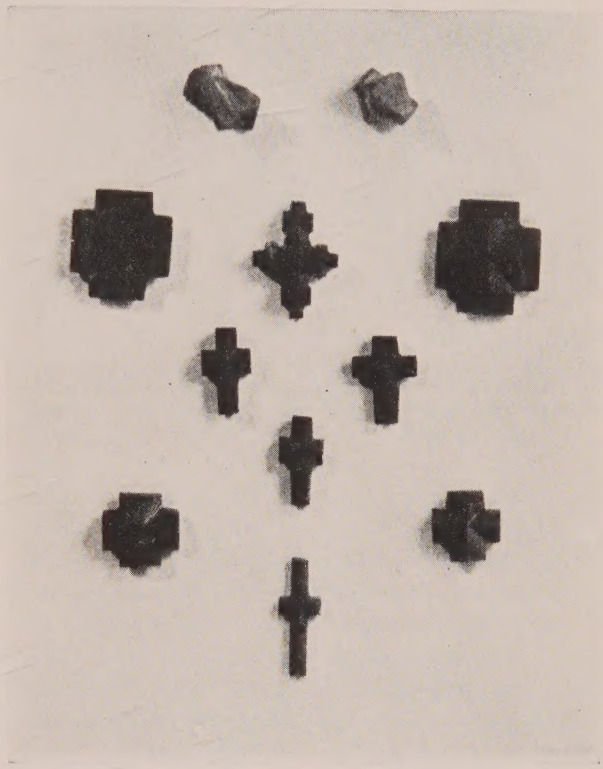
Such is the legend of the famous fairy stones; a beautiful tale, still believed by many natives; beloved even by those who doubt. These little crosses, the fairy stones, are particularly abundant in Patrick County, Virginia. In one area of about fifty acres they occur commonly down to a depth of about ten feet. Within this restricted plot they can be gathered as can acorns beneath an oak, and also are to be found deeply imbedded within the stone of the mountain.

Perhaps the most amazing thing about these strange minerals is their physical formation. They form three distinct types of crosses—the Roman, the Maltese and the St. Andrews. Each is perfect in form and as true to type as though cut and fashioned by hand. It would seem as though Nature, in this mountain paradise, had left a store of symbols of three major faiths, each one based upon the cross.



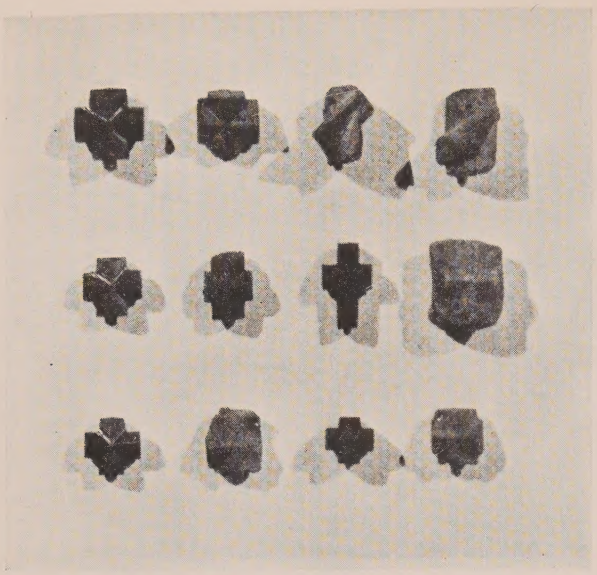
Seen in a jeweler's case, their surfaces cleaned and polished, the little crosses lose some of the charm and surprise that they will give you when you walk through the forests of Patrick County and pick them up from the ground. Then you truly feel that uncanny, unearthly elements have been at work.

Under the stimulation of the legendary atmosphere, as well as their natural allure, these stones are polished and worn as jewelry. They are believed, of course, to preserve the wearer in good luck and good fortune. A native of the region would never think of travelling without one of the crosses on his person.

Prominent officers in the World

THESE CURIOUS STAUROLITES CAN BE GATHERED BY THE HANDFUL

In Patrick County, Virginia, they are so plentiful the supply seems inexhaustible. At left are the raw stones as found in mica-schist and above are the stones as they are purchased from a jeweler and as they are picked up and buffed



BEFORE AND AFTER

Beginning at the left, row one shows the finished stones prepared from row two, and row three those worked down from row four. For generations the natives of the area have occupied themselves largely with preparing these stones for market

War carried these cross charms. Woodrow Wilson was sent one to wear for good luck and success in his presidential campaign. Theodore Roosevelt carried one with him everywhere. Rosa Ponselle, while visiting the section, sent one of the little crosses to the Pope for his blessing. The fairy stone plays an important rôle in John Fox's novel, *Trail of the Lonesome Pine.* The United States Geological Survey once stated that the fairy stone of Virginia is perhaps the most curious mineral found in the United States.

The fairy stone, technically, is an extremely complex silicate of hydrated iron-aluminum crystallized in the orthorhombic system. The stones are of a subvitreous to resinous lustre; reddish brown to black in color. The crystalline varieties are frequently cruciform, because of mineral twinning. It is observed that these forms seem to occur in crystal (mica) schists, and are usually associated with kyanite, garnet and tourmaline. The fairy stone goes by the general name, Staurolite: a silicate of iron and aluminum, with water, known to the scientist as $HFeAl_5 \cdot Si_2O_{13}$.

Risking the loss of romantic interest in them, we will go on to report that this mineral is hard, 7 to 7.5, with a specific gravity of about 3.7. The stones are opaque. However, in Brazil transparent staurolites are found and valued as gems. The name staurolite is derived from the Greek, *stauros*, a cross, and *lithos*, stone. Staurolites are found plentifully throughout the New England States, North Carolina, Georgia, Switzerland, Brittany, Tyrol and France.

One can gather from the illustrations the effect produced by the "twinning" of orthorhombic crystals. The orthorhombic is the third great system of crystals, and in this system are found more than two hundred different minerals, some of them of rare beauty. This system is a realm of widespread interest among mineralogists, geologists and chemists. Outstanding species are topaz, aragonite, chrysoberyl, (staurolite, already mentioned), barite, celestite, anglesite, cerussite, stibnite and chalcocite. The complexity of these formations stimulates the interest and ambition of the student in mastering these minerals. "Orthorhombic" has been derived from the Greek *orthos*, straight or right, and *rhombos*, a rhomb, to describe crystals having three axes at right angles to each other, all of different length.

The cross staurolite is the Siamese twin of the minerals. It is a perfect example of the clear intergrowth of two prismatic crystals at almost right angles to one another. Each crystal is a six-sided prism; these prisms are found singly, or individually, as well. The Roman and Maltese types are, of course, formed by the nearly right-angle twinning, while the St. Andrews is formed by a 60-degree intergrowth.

While some frequently occur in twins, others never do. Twinning is particularly abundant in the great group of feldspars. The diamond is well-known as a twinning mineral, usually in the attractive and interesting form of what is called an octahedral twin, the simplest form of twinning. Because it is common with the minerals diamond, spinel and magnetite, the form is also referred to as a "spinel twin." The difference between the octahedron and the "spinel" is that in the spinel the twin half occupies a position exactly reversed in relation to the other half, as if the half had been turned on the plane 180 degrees. In fluorite we find "penetration twins," in which two cubes seemingly have penetrated each other. Good examples are found in England. Most cases of twinning are complex and difficult to understand, but upon bearing in mind the half-circle revolution of one part of the crystal many twin crystals are usually easily identified.

The fairy stone, however, has ranked itself as a peer among twins. A state of ever-present wonder exists in their peculiar presence. One is able to walk about and pick them up bare from the ground. This has been done for many years. Quantities have been removed for marketing, yet the supply appears the same today as on the occasion of their discovery. The adhering clay is buffed away, and with a small file the unwanted protuberances are removed so as to bring out more sharply the contours of the perfect cross, then they are soaked in sweet oil or linseed oil to bring out the darker lustre. Now they are ready for the jeweler's case, sometimes to be capped with gold. They are worn as lockets, pendants for watch-fobs, or simply carried in the pocket as a charm.

Imbedded in the stone of the mountains, the fairy crosses further incite wonder, and in the inquiring scientific mind, a desire to know more about the forces concerned in their origin. Geologists tell us that the rock containing the staurolites was originally deposited as a clay or silt. During the succeeding ages the imponderable pressure and the heat of deep burial rearranged the substance of the mud to form a hard rock, mica schist. During this period of rearrangement the staurolites took on the form of the fairy crosses as we now find them.

NOSES

From the button-nose of the rabbit to the elongated proboscis of the elephant, Nature has provided for each animal's purpose

By MARIE-ANNE JORDAN

THE NOSE is primarily the organ of scent, but is perhaps equally useful for breathing. Many animals have poor sight, and scent serves them to a great extent in place of eyes; in fact some species can learn more by scent than a human being can with his five senses combined. In the long process of evolution this dual function has encouraged the development of noses into organs that are highly efficient for many purposes. Thus they vary widely in size and shape throughout the animal kingdom, and study of an animal's snout will teach us much about its habits.

Mammal noses, in a way, may be roughly divided into two classes; those having flat tips with nostrils close together and squarely in front, and those having slanting nostrils that run well back toward the sides of the muzzle. However, there are probably as many more that are difficult to place in either category.

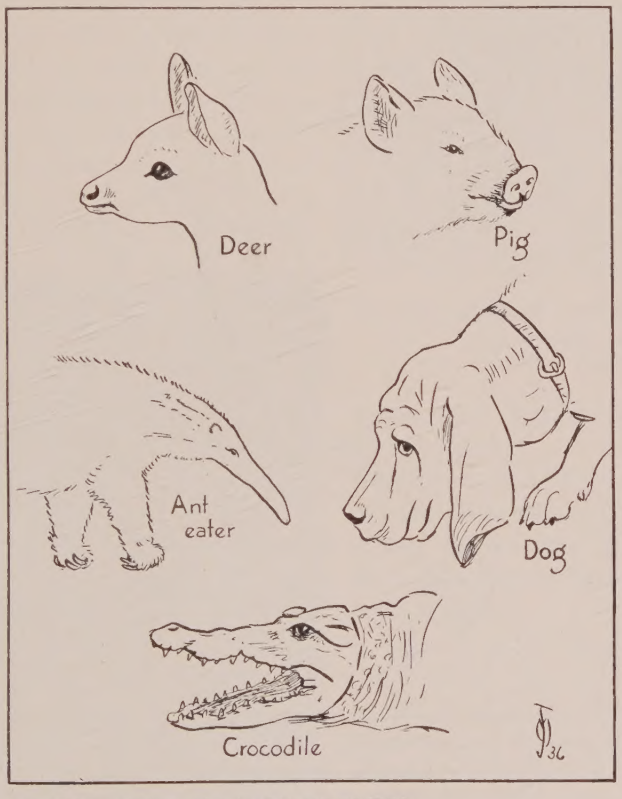
A number of mammal groups possess more or less prominent bulbous growths that seem to have little relation to the needs of the creature. These are sometimes associated with such features as the elongation of lips useful in food-gathering. These growths in some cases, as in the sea-elephant, are best developed in the male, and may be ornamental. In this class apparently fall the colored facial ornaments of the mandrill and other apes. Others, like those of the moose and the saiga antelope, seem to defy explanation, although they have been provocative of extensive speculation. As a matter of fact, numberless developments of Nature are unexplainable in the present state of our knowledge.

The dog family, which includes wolves, foxes, jackals, and some others, is a good example of the efficiency of the flat-tipped nose. These creatures are hunters and follow tracks with nose to the ground, tracing their prey by power of scent. For this purpose the flat nose is especially well adapted as it can be brought close to the ground, thus enabling its owner to pick up a scent far too faint for any human nostril to detect. Since all of these animals are mainly carnivorous and subsist principally on prey captured by stealthy hunting, the nose is a most important part of their equipment.

The hounds are excellent examples of dogs whose powers of scent, originally developed as wild hunters, have been protected and trained by man for his own use in pursuing game animals. One of the most famous of all trailers, perhaps, is the bloodhound. For a long period he has been used by man in tracking criminals and locating lost persons. Not only has he been trained to follow the scent of a particular person, but to locate a body or clothing that is buried deep in the ground or under snow.

The cats, with numerous species ranging in size from the domesticated tabby to the lordly tiger, and inhabiting nearly every type of habitat the world over, have the same type of nose, and the same statement applies to various other land carnivores. The bears, although only in part carnivorous, and more hunters of roots and burrowing creatures than of active prey, have a similar nose, and use it well.

Especially suitable for another purpose is the flat snout of the pig. This serves not only as an organ of keen scent, but also as an agricultural implement, for by means of the tough cutting edge at its tip, its owner can plow and turn the soil. The strong head, neck and shoulders enable this powerful animal to turn over in a short time a considerable area of rock and soil in search of the fleshy roots and tubers that are so gratifying



VARIOUS NOSES FOR VARIOUS DUTIES

Sharp noses with side nostrils for multiple use; pug noses for rooting; long thin noses for probing in ant-hills; straight, flat noses for following a scent; noses on humps for breathing while the rest of the animal is under water

to his appetite. Knowing these facts, it is not difficult to understand how much havoc may be wrought when one of these animated ploughs gets into a garden.

All of the deer family and many other groups have nostrils that open sideways, enabling them to detect quickly and easily the approach of danger on a passing breeze. Often their safety depends largely on their keenness in this respect. Scents are detected from remarkable distances when they are carried down the wind, and many a wild creature has bounded to safety before its presence became known to its enemy. Several animals that inhabit cold climates are able to detect food that in winter is buried deep under the snow.

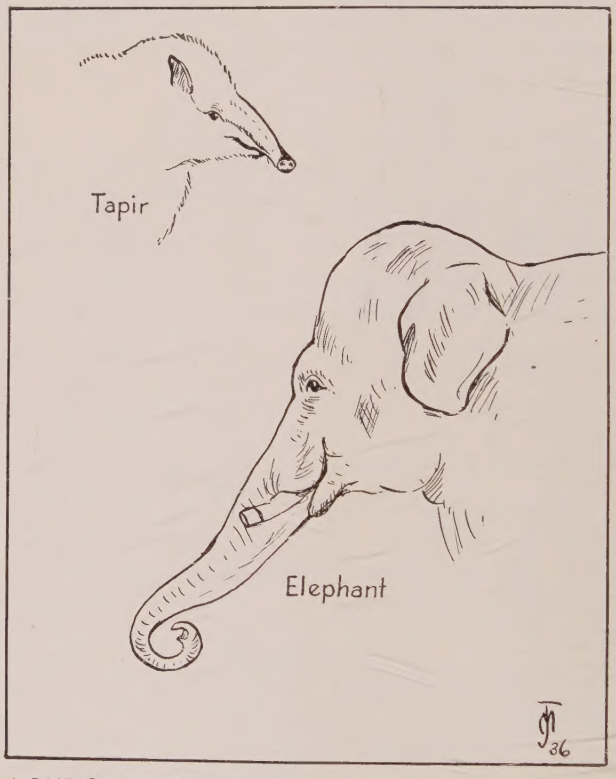
The horse exhibits a type of nostril that is useful to creatures that may be forced to spurts of great speed, when there must be a large intake of air to supply sufficient oxygen for the lungs. Their nostrils are large and can be widely distended when necessary.

The nostrils of the camel are well adapted to its peculiar environment. They are long and narrow, and are set in soft skin that permits them to expand when the animal is travelling and to contract when he is at rest or in the face of a desert sand storm. This fact enables the camel to survive storms that would be fatal to others less well endowed.

Upon inspection of the long, queer looking snout of the alligator or crocodile, one will notice that there is a slightly raised hump at the end, and on the sides of this hump are nostrils that are mere narrow slits. These slits act like valves, remaining open when the animal is breathing air, and closing and tightly sealing the air passages within, when he sinks beneath the surface of the water. As he swims or floats nearly submerged, with his eyes projecting above the surface, his elevated nose tip is just far enough out to permit his breathing in that position. In search of food he moves silently and smoothly, seizing his unsuspecting prey with a sudden snap of his strong jaws; then, when he drags his victim beneath the surface to devour it, his nostrils close to prevent the intake of water. Other air-breathing and water-loving animals, like the hippopotamus, seal and walrus, are provided with a similar type of nostril, although they are differently placed in the various species.

The burrowing moles and shrews have a peculiar adaptation of the snout that they use in their tunnelling. The tiny pointed muzzle indicates the presence of an insect or worm, and in the loose soil may help in its pursuit. The star-nosed mole has several tiny feelers radiating from the end of his nose. From their shape, and position one must conclude that the nose of this animal is an extremely delicate organ of touch and can detect the slightest indication of movement in the earth about it. The mole's quest is for beetles, grubs, cutworms and similar pests, and of these he can eat his own weight each day.

Another curious form of nose is the long tubular muzzle of the ant-eater. This probe-like organ has its specific use, since the ants in its habitat build up huge mounds of hardened earth, sometimes five and six feet in height. To obtain the insects that dwell in them, he must have special tools. With his powerful claws he tears his way into the ants' fortress and his long slender nose and flexible tongue dispose of an immense number of its occupants.



A PAIR OF DE LUXE NOSES

The tapir's proboscis is the right length for pulling young shoots from shrubs, and the elephant's long leathery appendage is used for doing almost everything

Then there is the tapir. His muzzle is too long to be called a nose and too short to be classed as a trunk. However, it is well adapted for pulling leaves and shoots from trees and shrubs, and when poking about in the long grass in search of fallen fruits that are particularly tasty to him. Perhaps it is useful also in his watery retreats.

But the most wonderful and versatile nose of all is that of the elephant. This huge animal eats an unbelievable amount of food each day, and this is all conveyed to his mouth by means of the trunk. It serves also as arm and hand, and with it he is able to tear limbs from the trees, or even to uproot a moderate-sized one. This ability is useful to a forest browser.

When the elephant is swimming his trunk serves in the same capacity as a diver's air tube. By keeping it above the surface of the water, he has an intake of air, even though his entire body be submerged. He also uses it as a pump, for by lowering it into the water he can suck up a long drink, and by inserting the tip in his mouth he can force the water down his throat. Then it may assist him to take a shower bath. After his thirst is quenched, he can spray himself with water. At the end of this trunk is a sort of finger that approaches the human hand in its dexterous use.

So the nose is found to be a most necessary and useful part of the animal body, serving many purposes in different forms. It furnishes protection to the lungs, acts as a plow, a probe, a hand, an arm, a club, a pump, a blow-pipe and a feeler. Doubtless there are other ways in which noses are put to use; Nature is an open book, and those who are interested in studying its pages may discover an infinite number of interesting facts.

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The Acadian Owl

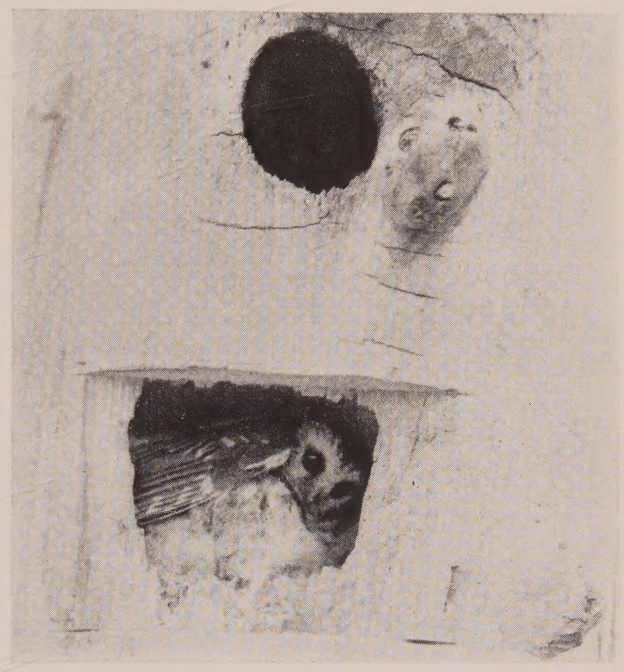
By REV. P. B. PEABODY

AT THE spring-time break-up, one year, with four feet of snow on the levels, the only child of parishioners, living twenty miles away, died. I was called to the burial. Floods of water barred traffic. On the day I was needed, trains were suspended. Wagon use was impossible; horseback it must be. A sullen rain was falling.

At six miles from my journey's end, I could ride no farther. I guided my mare over a fourteen-foot drift, and left her with a kindly ranchman. Then, a weary six-mile trek along the railroad right-of-way. Two miles from my journey's end, weariness became beguiled by the delicious fluting of an Acadian owl, borne from afar on the still night wind. I counted the repetitions, for a time. There were four hundred of them. Arriving in town, weary though I was, I went a half-mile farther in order to locate

the trysting place of the owl whose notes had buoyed me up.

At a later missionary visit, I rose early one morning and set out northward along the wooded stream. At a half-mile distance, I came, all at once, on a rotten elm stub. Telepathy whispered; I rapped on the rough bark. Instantly the little Acadian slowly pushed her head out of a flicker-hollow, ten feet up; gravely peered down at me. The cavity had been long in use. A headless mouse lay therein. Many warbler feathers were embedded in the rough wood inside the foot-deep cavity. Masses of mouse fur lay at the bottom of the aerie, bedding the eggs. There



MOTHER ACADIAN OWL BROODING HER YOUNG

The revealing opening was cut into the old tree. At the left three two-weeks-old owls pose

were seven of these, a number that seems to be unique for this species.

Another day I followed the same narrowly wooded riverlet still farther up-stream. At three miles, I came, all at once, upon a large barkless cottonwood stub. A large flicker hole showed twelve feet up. A sharp rap brought out a little owl.

Fourteen inches down in the cavity, on a bed of powdered pellets, lay three supremely ugly pin-feathered purblind owlets. At a later visit, what a transformation! The little owls were as beautiful, then, as they had been hideous, a week before! Clad in velvety coats of soft brown-gray-green, with white areas between and above the eyes, they were gentle little things. At my first visit the mother owl had been brooding her squirming young; at my second, she was nowhere near. The really exquisite plumage of the young Acadians was in marked contrast with the speckled gray plumage of the adults. Because of this utter contrast, this condition had led, in the callower days of American ornithology, to the establishment of a "new species". We know better, now!

In photographing these pliant little subjects, I noted that one of the trio—presumably the youngest—habitually "froze" as I posed them. With young birds of some species, this reaction seems to be purely individual; with other species, racial.

Tree Snails of South Florida

By MARGARET FLORENCE DOE

ENCHANTING south Florida, with its tropical palms, banyans and flowers, may well be called the Paradise of America. The peninsula, bound on the east by the crystal waters of Biscayne Bay, on the south by the emerald waters of Florida Bay, and backed by the Gulf of Mexico, is lulled by the timeless motion of these foam-crested breakers that constantly pound against the shore and create a rhythm that is repeated by the wind in the trees from coast to coast.

Extending beyond, breaking through the peninsula's tip to the south, lies the chain of the Florida Keys that in the Miocene or Pliocene Ages possibly formed a natural bridge connecting Cuba, the West Indies and Central America. The inner shore line of the Keys in the southeastern mainland is fringed with a growth of mangroves; on the open side fronting the bays are rocky or sandy beaches. To the west of the coral formation ridge that extends along the coastal border are the Everglades, artificially drained in part by lateral canals. Rising at intervals to an elevation of approximately eight feet above sea level is land with dense and almost impenetrable jungles or hammocks similar to the hammocks on the Keys. This area, bordered by immense cypress swamplands, harbors tropical hardwood trees of West Indian origin.

THE HOME OF THE TREE SNAIL

Florida hammocks, small areas of dense tropical undergrowth, are the native haunts of the arboreal snail

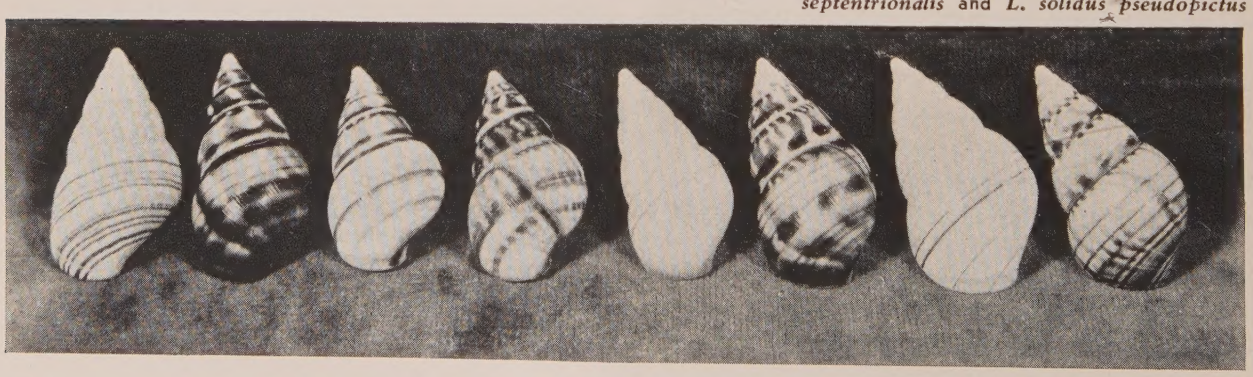
The rare tree snails, genus *Liguus,* live in these hammocks of West Indian trees, making their home on gumbo limbo, poisonwood, red ironwood, mastic, mahogany, and lignum-vitae.

Liguus is an arboreal snail dwelling in a self-produced shell of highly polished texture. Its eyes are situated on the ends of long tentacles that fold back when it is disturbed. There are twelve species described from Florida and the Keys, and a total of forty-eight, including subspecies, each having its own characteristics in color and design. Florida trees are rare in beauty. In addition to their own foliage they are adorned with many epiphytes known as air plants and orchids. The live oaks are bearded with Spanish moss, and the banyans send down strange entangling roots, but trees decorated with these colorful snails that are browsing for small microscopic plants have a gipsy brightness. Thus the ornamental yet meek snail inhabits the trees, feeding on bark and leaves, leaving its home only to travel across the land to form new colonies and to lay its eggs in the ground. It buries itself to deposit the eggs in the leaf-mold. After approximately eight months the eggs give forth the minute snails. The estimated life of *Liguus* is nine years.

During the dry, cool winter season of Florida these snails fasten themselves to the trees by throwing out a gummy substance that hardens and attaches the shell so firmly to a tree that often it will break when removed. The gastropod becomes dormant during this period of estivation, much as some animals hibernate, but the organs do not cease to function. In the Cape Sable area, in the vicinity of East Flamingo, a collecting party found snails tucked in a variety of nooks for their winter slumber. One air plant had furnished some fastidious *Liguus* a lovely air-castle for a winter abode; others had mounted the height of the stately royal palm, while some had traveled the thorny road of a tree cactus, securing themselves among the prickles for their winter re-

EACH SPECIES OF TREE SNAIL HAS ITS OWN CHARACTERISTICS IN COLOR AND DESIGN

The shells on this and the next two pages, shown approximately one-half life size, are from the collection of C. N. Grimshawe. On this page, left to right, are: ***Liguus crenatus matecumbensis, L. crenatus barbouri, L. crenatus floridanus, L. crenatus nebulosus, L. crenatus luteus, L. crenatus marmoratus lucidovarius, L. crenatus septentrionalis*** and ***L. solidus pseudopictus***



SIXTEEN MORE MEMBERS OF THE *LIGUUS* TRIBE, ALL FROM THE HAMMOCKS OF SOUTH FLORIDA

They are, reading in the usual direction, ***L. fasciatus castaneus, L. solidus lignumvitae, L. crenatus marmoratus, L. solidus dohertyi, L. fasciatus testudineus, L. crenatus vacaensis, L. crenatus gloria-sylvatica, L. fasciatus walkeri, (Below) L. fasciatus versicolor, L. crenatus aurantius, L. fasciatus miamiensis, L. crenatus barbouri, L. solidus delicatus,*** the yellow and dark form of ***L. crenatus marmoratus,*** and ***L. crenatus marmoratus violafumosus***

treat. To the thrill of the collecting party it was found that in this area *Liguus matecumbiensis* and *L. vacaensis,* species described in the Cape Sable location, were attached in large numbers to dead trees. Excitedly the collectors took from five to ten in this lethargic state from a single tree, a find only to be appreciated by the snail collector who often spends a whole day in search for this lovely snail and returns home with less than a dozen. Just as each bird has its own plan for building its nest, the various species of tree snail have their own secrets of estivating by choosing dead trees, places under vines, the tops of jungle trees, or the inside of curled bark.

The dry season slumber is over with the first spring showers. The substance holding the snail in its position dissolves, and the snail becomes active and immediately begins to enlarge its shelly home. The new growth so neatly joins the old that it is impossible to discern the new structure from the old. Thus the life of the tree snail is divided into the two distinct periods of estivation and growth.

Where there is mystery there is enchantment, and much mystery surrounds the existence of the Florida tree snail. When did the tree snail first make its appearance as a form of life? How did it get into the depth of the Florida Everglades? There is a theory that these air-breathing mollusks were brought over on trees borne by the Gulf Stream from Cuba, established themselves in the hammocks near the coast and were later washed by tidal waves into the interior.

Tropical Florida has long been a delightful and fertile collecting ground for the lepidopterist, but few naturalists have, until recently, pursued *Liguus.* The hunt begins early in the morning, leading the collector either on long trips to the Keys or into the Everglades. There is no prairie, forest, or plateau as treacherous as the Everglades, which looks so much alike in every direction that one must carry a compass to determine the direction. There is danger of being lost, sinking into mire, or falling into a pot-hole of porous rock often thirty feet deep. Great diamond-backed rattlesnakes and moccasins are abundant in south Florida and the hammocks are full of poisonous plants, spiny cactuses, and Spanish bayonets. Yet with all its perils the Everglades hold as much mystery for the explorer as do the jungles of Africa. The collector must walk great distances in the intense heat to reach the haunts of *Liguus* locations and cut his own machete paths through the jungles. Therefore, in order to follow the life of a Nature lover and to satisfy the desire for collecting the fascinating tree snail the collector must don heavy boots or leggings and durable clothes, must carry a canteen, and a knapsack for a "Lig-bag", and must have a hawk eye, a strong back and a weak mind.

The eagerness of the school boy who hunts shells and queer stones along the banks of lonesome creeks, skipping the woods with a thousand steps of youth's energy, cannot be compared with the enthusiasm of a seasoned *Liguus* hunter. The man becomes a boy again, and snail collecting becomes an indispensable habit that masters the man. Many hunters use a long bamboo rod with a tin cup attached to the end; others climb trees monkey fashion. But, by whatever method he adds shell to shell, the collector finds a delight in taking these beautiful

objects that, to him, this particular pursuit alone can give.

While exploring one may be entertained by the song of the Florida mocking-bird and the proud red cardinal, the rustling wind in the tropical woods, and the restful hush of Nature. Only the setting sun warns the collector that he must give up the hunt and return to the highway before nightfall, or be swallowed up in the vast expanse of the Everglades.

These snails are a royal family, adorning themselves in elaborate colored shells. The grayish white or cream *pseudopictus,* with bluish axil smears and zig-zag brownish lines on the fifth and sixth whorls, the last whorl characterized by horizontal green and brown lines, the sutures portrayed by squarish brown spots, is one of the loveliest of the snails taken from Matecumbe Key. The *delicatus,* delicate in color and structure, has a background of cream coloration speckled near the apex with mottled blue, paralleled on the whorls with lavender and green lines. However, it is no more beautiful than its neighbor, a thoroughbred colony of *dohertyi,* named in honor of Colonel Doherty, distinguished by its bars of brown at the sutures on an ecru background and a shell as thin as paper. These species are confined to Matecumbe Key.

The *castaneozonatus* quickly attracts the eye with its sporty ensemble of black and white bands. They vary from pale yellow with green stripes to deep yellow with a rose apex, but the yellow *floridanus* with the upper half of mottled yellow and blue is distinguished by a white tip. Many white shells or those white with a yellow cast have vertical spiral stripes, but vary greatly in structure, as illustrated by a *matecumbensis,* a white shell striped with green. There are many color forms of the *versicolor* and in beauty of color combination they challenge the bright tropical butterfly. They are brilliantly polished and have a ground color of greenish to brown or sometimes bluish to bluish-black with narrow zig-zag yellow axil stripes and splotches having a double row of irregular brown spots bordered by smoky bands, making an effective ensemble.

Several species have various hues of brown. The *splendidus,* a rare *Liguus,* is the most outstanding, having irregular horizontal lines of reindeer-brown on a shiny cream base. The rather small *alternatus* displays alternating bands of chestnut-brown and white and a bright pink tip that determines its individuality.

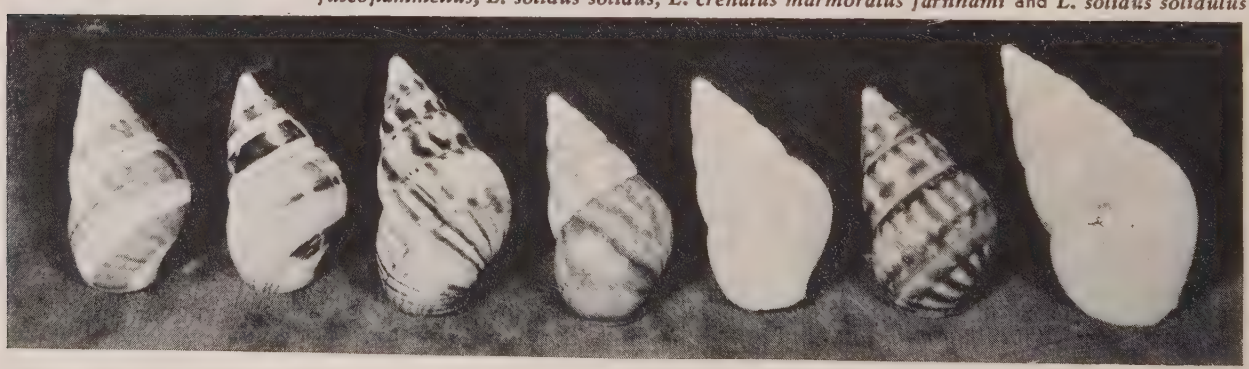
Nebulosus, or blue cloud, is a miniature canvas of the colors reflected at twilight on the Blue Ridge Mountains. *Liguus walkeri,* collected in the Pine Crest region near the camps of the Seminole Indians, exhibits on its porcelain shell the stripes of the Indian costume.

The death bell for the Florida tree snail is beginning to toll, and we may begin to mourn for its disappearance. Unsatisfied greed prompted by competition among collectors is fast eliminating them, as collectors are taking every adult specimen available. Years ago the *Liguus* enjoyed the freedom of the Everglades in the same manner as the buffalo formerly enjoyed the Western plains, but just as every precious and rare beauty in Nature has been exploited, the tree snails are fast becoming extinct. No doubt species that were abundant hundreds of years ago will never be known to science as they no longer exist, and some types that could be found a few years ago have been "collected out." The Florida raccoon and the swallow-tailed kite play their part in their destruction; the raccoon taking advantage of this mollusk during estivation, and the graceful kite, soaring in the air, spies the shell and pounces on it with sharp talons. Everglade fires sweep the hammocks, leaving only fragments of shell, and the hurricanes uproot the trees and destroy the *Liguus* with the salty spray.

The designs on the shells of a collection harmonize and interweave into such odd combinations that it would be difficult for even the artist to reproduce the colors with their variety of dashes and splotches and stripes on the sutures and whorls. With their cone-shaped shell tapering whorl by whorl from apex to columella, *Liguus* is decorated as only Nature, in most artistic mood, can decorate.

THESE VARIETIES OF THE *LIGUUS* TRIBE ARE EXTREMELY RARE

They are the ***L. fasciatus alternatus, L. fasciatus deckerti, L. solidus splendidus, L. crenatus fuscoflammellus, L. solidus solidus, L. crenatus marmoratus farnhami*** and ***L. solidus solidulus***



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Did you know that you can patent a plant? In the March issue of Nature Magazine Harry Goldsmith tells us of many interesting patents that have been taken out under the provisions of this recent law.

The Australian Bush by Day and Night

A Nature photographer from "down under" offers a few suggestions for obtaining the best results with your camera

By R. T. LITTLEJOHNS

Photographs by the author

IN THE varied fauna of Australia there is sufficient material to keep camera hunters busy for many years to come. But the number of photographers has increased in recent times to such an extent that those of us whose spheres of operations are restricted to the more settled areas now find it difficult to produce novel pictures. And that fact, combined with a childish delight in devising "gadgets," has accounted for the use by the writer of systems of automatic photography that are not used by other Nature photographers in Australia.

It may be explained, first of all, that most attention is devoted by camera hunters here to birds, these being the intelligent creatures most easily available in daylight. The methods used to obtain bird pictures vary little and operations are confined almost entirely to the breeding season. The camera is set up usually before a nest containing eggs or young birds and is focused on some point where it is expected that the adult bird will perch. The actual exposure is made later from a distance by means of a line when the subject occupies exactly the position desired. The variety of pictures that may be obtained by this method is somewhat limited and many incidents in the life story of the subject escape the photographer's attention. Furthermore, birds that visit but do not nest in the area covered by the photographer cannot be pictured at all. The use of an automatic camera, however, opens a new field for the Nature-lover, not only in respect to birds, but in the realm of the furred folk also.

The system of "gadget" photography used by the writer had its origin in a desire to solve a nesting mystery of the yellow-tailed thornbill or tom-tit. This common bird lays its eggs in a large, untidy, domed structure with a small

SUCCESSFUL NIGHT PHOTOGRAPHY

Taken automatically, this picture shows the fantail sleeping with its head completely buried in the feathers. Below is the yellow robin chick with its head resting on the edge of the nest

entrance in the side. But on top of the closed-in egg chamber there is invariably an open "sleep-out," the purpose of which is obscure. Some observers believe that the upper nest is built to deceive the cuckoo so that it will lay its unwelcome egg there instead of in the nest proper. The weakness of this theory is in the fact that the cuckoo is not deceived. Other observers think that the "sleep-out" is a shelter for the non-sitting bird at night. It was with the hope of proving this latter theory that a complicated and primitive apparatus was constructed to photograph the tomtit's nest at night. It was necessary that the equipment should function automatically, as the presence of the photographer near the nest at night would frighten the sitting bird and possibly cause the destruction of the eggs or young. Two flashlight pictures taken at tom-tit nests, however, have failed to show a bird in the top nest in either case. Many other uses of the system became apparent, however, and the original purpose of the apparatus has been abandoned temporarily.

Curiosity as to the night-time attitude of nesting birds suggested the next flashlight exploit. The small open nest of the gray fantail was the subject of operations, and the

camera was focused in daylight. A small clock ticked away the hours until midnight, when an attachment on the winding spindle completed an electric circuit. There followed a flash of bright light during which the shutter of the camera opened for 1/100th part of a second. There was considerable excitement during the development of that negative—the first photograph obtained by the new system. The picture proved two things. First, it showed that the fantail slept with its head so completely hidden beneath its wing that it appeared to have been decapitated; second, that in this instance, at any rate, the mate of the brooding bird did not sleep in the immediate vicinity of the nest. Another flashlight photograph of a yellow robin that was brooding three well-grown chicks in a bark nest also revealed the adult bird hidden as in the case of the fantail, but the chicks apparently preferred to breathe fresh air rather than to remain under the feathers of the parent, for which you can hardly blame them.

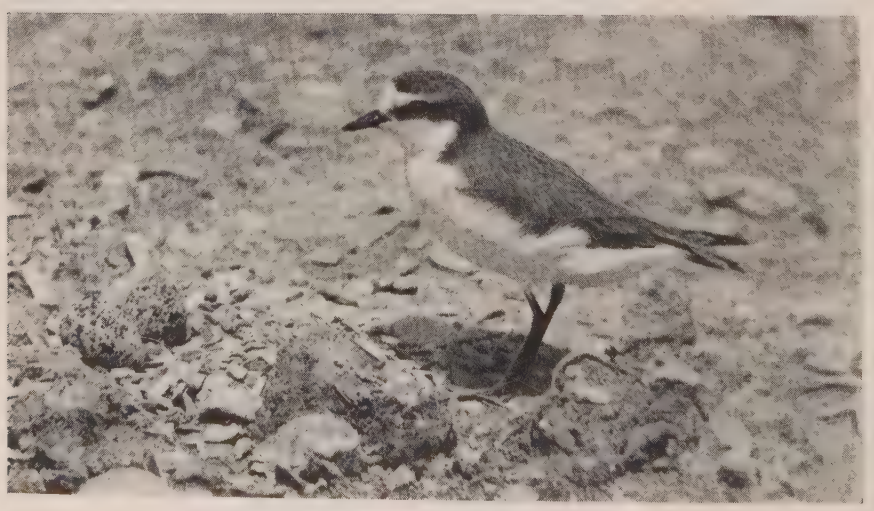
THE RED-CAPPED DOTTEREL AT HER NEST

The contented dozing attitude of the bird shows that the picture was taken by the automatic clock-camera in the absence of the photographer. Below, photographed in the orthodox manner of operating the shutter with a thread, the same bird is shown in an alert and unsettled mood

Although flashlight pictures of sleeping birds may be novel and interesting to the bird student, they are not always appreciated by the general public. Furthermore, there was a lack of variation in the results obtained, so that it became desirable, after a time, to seek some other aspect of wild life to which the system could be applied. The furred animals at once suggested themselves as suitable subjects. These creatures are almost invariably nocturnal so that such pictures as existed, having been taken in daylight, were not entirely natural. This branch of flashlight photography is the most interesting of all. The necessity for self-acting apparatus to picture nocturnal animals is apparent, as it would be impossible to focus the camera at night. The ignition of the flash-powder is effected, in the case of animals, not by a clock, but by a sensitive switch set so that the animal itself will operate it. There were many difficulties to surmount, not the least of which were the actions of the damp night air on the camera shutter and the flash-powder. The camera was protected from the weather by a camouflaged box and the flash-powder was enclosed in a container furnished with a lid held closed by a thread. A second thread that passed through the flash-lamp and out through a hole in the lid held a small spring switch in the "off" position.

When the flash is fired by the prowling animal (or in a distressing number of cases by the falling of a twig or other accident) the two threads are burned immediately. This, first of all, allows the lid of the flash-lamp to open and thus prevents the loud report that would occur in a closed space. The burning of the second thread closes the switch that operates the camera shutter by means of a relay. In this way the synchronization of the camera and the flash has been accomplished, not, however, without long and costly experimenting.

The remaining difficulties concern the ways of the unwilling subjects. There have been many incidents that would have been humorous but for the sinful waste of magnesium powder. There have been, for example, a dozen attempts to obtain flash-light pictures of wombats, pig-like burrowing animals, in Sherbrooke Forest near Melbourne. The camera and flash have been installed outside burrows in which it was certain the animals resided, but at no time has the form of a wombat appeared on the negative. The apparently successful operation of the apparatus at the first trial gave rise to high hopes. After a period of breathless excitement the developed plate was



examined in the light. It showed a perfect night-time view of the wombat's burrow and the surroundings but never a suggestion of a wombat. Subsequent examination with a magnifier disclosed the fact that a large black land-snail, native to the area, had blundered on the sensitive switch during his aimless wanderings. On a second occasion the open flash-lamp in the morning indicated that some agency had operated the equipment. Would there be a lumbering wombat in the picture? Would it be going to or coming from the burrow? Perhaps, even, there would be more than one animal, in which case the picture would be a special prize. Actually, there was no wombat at all. An animal there certainly was, however. A small bush rat, evidently hurrying to keep some night-time appointment, had bounded up on the contact plate and showed as a blurred streamlined object on the negative. After these experiences the contact was fastened at a little distance above the ground out of reach of the snails and bush rats. Thenceforward the apparatus, when set for a wombat, has wasted its efforts on the night air. It has become apparent that the lumbering creature is not as dull as he looks.

MAMMALS ARE INTERESTING NIGHT SUBJECTS

This silver-gray opossum set off the flash and opened the camera shutter by touching the sensitive switch concealed in the bark of the tree

Greater success has been achieved with other animals at a charming Nature-lovers' cabin provided by an interested land-holder for the convenience of Nature students. In the sanctuary that surrounds the cabin, native animals abound, and at dusk, when bird-life has mostly become still, the furred creatures emerge from hiding places in the gnarled and stunted trees. Chief of these night-time revellers are the large silver-gray opossums, fine animals whose furs were much sought in other times when they were unprotected by the law. In the bark of the trees around the cabin electrical contacts were concealed to be connected at various times to the flashlight-synchronized camera. At first the animals would not approach the cabin until the building was in darkness. So the writer's wife was hurried off to bed while the writer sat in the little kitchen with an eye glued to a small hole in the wall. Honey spread on stumps and tree-trunks led the animals in the desired direction and eventually their shadowy forms could be discerned in the moonlight or starlight. When the unsuspecting creatures approached the "live" switch the excitement became intense and the eye of the watcher was withdrawn from the hole so that the temporary blindness caused by the flash would be avoided.

After the flash trap had been sprung and re-set a couple of times it was left to its own devices while the writer retired. The attraction of the honey is so great that these creatures soon forget the shock of the explosion and return again to have their pictures taken. Unfortunately, the shortest exposure possible with the writer's present apparatus is 1/100 part of a second, not short enough to deal successfully with the smaller animals. At the first sound of the explosion, the small, active creatures jerk their heads so rapidly in their alarm that the forward end of the subject is considerably blurred. This difficulty could be met quite easily by the use of a camera providing for exposures of 1/1000 part of a second but, apart from the cost of the apparatus, there would be the prohibitive cost of ten times the amount of flash-powder used at present. However, it is hoped by a modification of the equipment to forestall the "jump" of the small animals without adding to the cost.

The small bush rats referred to earlier have fired innumerable flashes set for other animals. The number of these rodents in the forest apparently is without limit and their appetite for honey insatiable. But once only, on a very wet night, was a picture obtained that showed the head of the animal reasonably clearly. On another occasion, the flash trap, set overnight in the forest, was fired by one of the most interesting of native animals—the flying phalanger. These small creatures volplane from tree to tree with the assistance of a membrane joining fore and hind legs. In this case also, rapid movement spoiled what would have been a desirable picture.

During the course of much experimenting with the flashlight, other uses for the automatic camera became apparent. By the simple process of disconnecting the flash portion of the apparatus an efficient means was provided of picturing, in daylight, creatures whose portraits could not be obtained by orthodox methods. The white-necked heron, for example, nests in localities far removed from that to which the writer's activities have been restricted. But the heron comes south some years to fish during the non-breeding season, probably because of economic conditions in his usual habitat. In swamps and other shallow water he wades with the stately tread of all the heron family but, in ordinary circumstances, he may not be ap-

proached closely. The automatic camera, however, hidden at the edge of a swamp and focused on a spot in the water, captured his likeness when he stepped on threads stretched beneath the surface. The white-neck's smaller cousin, the white-faced heron, which breeds near Melbourne but usually in inaccessible places, has been photographed by similar means.

A further modification of the apparatus allows the photography of sitting birds that will not return to their nests while a human is in sight. In these cases a small clock has been installed beneath the camera and so arranged that the gradual turning of the winding spindle has operated the shutter with a minimum of noise. A red-capped dotterel whose eggs lay in a primitive shell-lined nest was photographed many times by the usual method of operating the shutter with a thread. But the pictures taken thus showed always an alert and unsettled expression, altogether different from the contented dozing attitude recorded by the clock in the absence of the photographer. These pictures were, therefore, much more natural.

The Adopted Squirrel

By C. BALDWIN WHITE

FRIENDSHIPS between members of species that are natural enemies are rare, and are interesting, therefore, when they occur. Dogs and cats do not always fight; lions and deer have been known to become friends, but when a feline not only resists the temptation to toy with and gradually destroy a rodent, and, instead, welcomes it into the family with her kittens, who, in turn, share their birthright with it—that is unusual. Such is the case of Rickey, a baby squirrel being cared for by Flossie Belle, a four year old cat belonging to Mrs. Brant of Chatham, New Jersey.

ANOTHER STRANGE FRIENDSHIP

Cats and squirrels are not supposed to get along together very well, but here is ample proof that it can be done

When Rickey was discovered on the high school lawn, he was much too small to be at large among the feline pets and canine guardians of the community. So he was transferred to Mrs. Brant's farm on the Passaic River—a veritable haven for pets.

Feeding presented a problem. Various kinds of nuts were offered, plain, salted, whole, cracked, and even roasted, but Rickey refused them all. Bread crumbs were scorned and cereal and crackers had little appeal. Finally a little milk was warmed and offered in a spoon. Rickey pricked his ears and chucked his bristling tail. The problem had been solved, at least temporarily.

It happened that at that time five little kittens were sharing just such a diet. Flossie Belle, their mother, was an untamed barn cat with no more liking for any of the rodent family than the rest of her kind, but she welcomed the newcomer as one of her family, and gave him every attention. Perhaps this was because Rickey is the only one of her present family who is gray like herself. Her own children are orange!

As he grows older, Rickey is becoming more boisterous than his step brothers and sisters, and is fond of strangers, all of which perplexes Flossie Belle, whose anxiety and care are not fully appreciated by her step-son. Flossie's care is not wasted, however, for more than once she has had to defend him against other cats of less charitable intent. One by one the kittens are being weaned, and going to new homes, but no one need ask for "Rickey;" Flossie Belle is too proud of him!

In the Yosemite Park region of California many mule deer that summer in the mountains descend in winter to the milder valleys. In such places the lighter snowfall enables the animals to avoid more easily their natural enemies, and find adequate food with greater ease. These deer are wintering in Yosemite Valley among the black oaks, whose leaves, acorns and seedlings form an important food during the season of stress.

Florida Nesting Birds

Wray H. Nicholson of Orlando, Florida, has been studying and photographing birds for many years. He specializes in depicting their lives during that most interesting period of their existence—the nesting season. On this and the succeeding pages are shown pictures selected from a large series by this student-photographer.

First is shown a mother prothonotary warbler feeding a young one that has just left its nursery, a snug nest built in a tree cavity, usually the deserted home of a woodpecker. This bird nests over the northern half of Florida and spends the winter in southern Central America and northern South America. Photograph made in Orlando, Florida.

Excepting our northern states and the higher mountains, all of our eastern country is inhabited by the blue-gray gnatcatcher, a dainty long-tailed bird whose principal colors are reflected in its name. In early spring, often when the tender green leafage is just tinging its haunts, the deep-cupped nursery is built in some firm crotch, usually in a slender tree at a considerable elevation. The structure is composed of plant fibers and down, dried blossoms, and fine grasses, held together with spiders' silk, and ornamented externally with grayish lichens.

A few gnatcatchers remain in Florida in winter, but most of them travel farther south to Cuba or Central America. Photographed near Orlando, Florida.

The Florida cardinal, which differs little from the form well-known to most observers in the East who live south of New England and New York, is here shown in a most interesting phase of its home life. The father bird is feeding the well-developed young, which will soon be on the wing.

The cardinal nests in bushes seldom higher than six or eight feet from the ground, and lays three or four spotted eggs. The bird occupies a variety of habitats, with a preference for the vicinity of water, and is well distributed over the state. It is non-migratory, and as it is found in the vicinity of houses, its beauty of color and song, and its general harmless habits, mark it as a favorite. Delaware, Illinois, and Kentucky have selected the cardinal as the State bird. Photographed near Orlando, Florida.

The grasshopper sparrows of central Florida differ from their wider-ranging relatives of our middle states in certain minor details, but their general habits are similar. The Florida form inhabits bushy and grassy prairie openings, nesting on the ground beneath a tussock of grass or a tiny bush. The name of the species comes from the resemblance of its song to that of a grasshopper, and the Florida race is said to possess a voice even weaker than its northern relative. This bird was photographed on the Kissimmee Prairie, Osceola County, Florida.

Whether nesting over a stream among the muskegs bordering far-off Great Slave Lake in the wilds of Canada and sharing its habitat with Bohemian waxwings, black terns, and sandhill cranes; or in a New Hampshire apple orchard, with a robin's home on a lower limb of the same tree, or beside a lazy stream in Florida's Everglades, our kingbird is ever the same noisy, restless fellow. Rarely overbearing in its relations to its small neighbors, it is violently intolerant of species that it recognizes as enemies. Possessed of courage that knows few limitations, the nesting parents are instantly ready to pursue any crow or hawk that trespasses on what the kingbirds recognize as their bailiwick. The interloper is set upon with such fury that it seldom stops to argue the case, but beats a precipitate retreat, considering itself fortunate if it can avoid actual body punishment. Even the lordly eagle is glad to move on when the kingbird gives orders.

The food of the kingbird consists chiefly of insects that are captured on the wing. Beetles, weevils, grasshoppers, butterflies, bees, wasps and flies are its main standbys. It sometimes takes bees, and is called the bee-martin in many places, but careful study has shown that it does relatively little damage to domestic bees, although occasionally a pair may render their company undesirable. Wild fruits are eaten to some extent, especially in the autumn when the birds are migrating. The kingbird winters from Mexico to northern South America. Photographed near Orlando.

With a rather general distribution at lower altitudes over most of the United States east of the Great Plains, the white-eyed vireo nests in summer throughout Florida north of the Keys. This species is unique among our vireos in the possession of a white iris, and in a certain petulancy of demeanor that is evidenced by frequent outbreaks of singing or by scolding notes that seem to be activated by the intrusion of other birds, or even insects or human visitors. It is a bird of low moist thickets, and its nest, semi-pensile as in all vireos, is consequently placed only a few feet from the ground and is often suspended from a trailing vine. Here the bird seems to resent Mr. Nicholson's invasion of its privacy.

PICTURE OF THE MONTH AWARDS

Some time ago we offered awards for what was described as "The Nature Picture of the Month." Many splendid pictures came in; so many, in fact, that we purchased faster than we could use. Now, however, we announce a somewhat different photographic award.

We wish to use on the first page of the Rotogravure Section each month a large picture that expresses the spirit of that month. For example, the catkins of the pussy willow suggest April in the northeast. However, our pictures should express the spirit and the feeling of the month as it is experienced in Florida or Oregon, California or Maine, Texas or Wisconsin. Each should be accompanied by brief text setting forth why, in the opinion of the photographer, it is felt that the picture submitted typifies a certain month. Pictures suitable for any month in the year may be sent in now. The photographs should be not less than five by seven inches in size, and be printed on glossy paper. The award will be open indefinitely or until we have every month represented. The award will be twenty-five dollars, and other eligible pictures will be purchased at three dollars. Send your pictures to the Rotogravure Editor, Nature Magazine, 1214 16th Street, Washington, D. C.

The idea for this contest came to us from Raymond S. Deck, who took the picture above. Incidentally, his is a composite picture. After many tries he got the picture of the birds on the ground with the magazines. Another try caught the chickadee perched on the corner of the open magazine. They seemed to belong together, so here they are. We do not want more "trick" pictures.

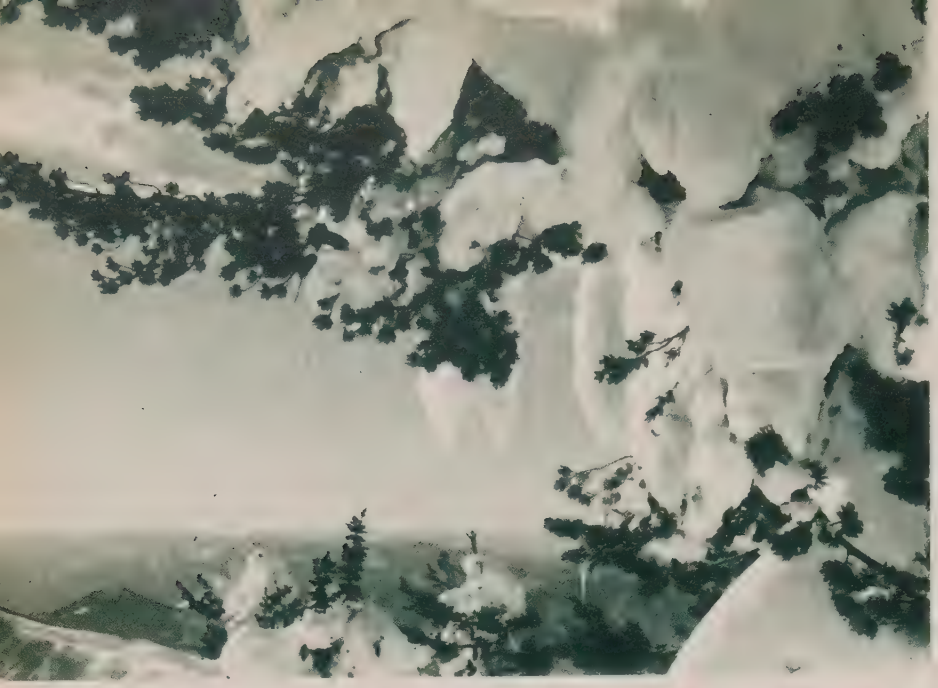
SNOW GHOSTS

As Photographed by K. D. Swan

A winter of heavy snow transforms the high mountain country of western Montana into a land peopled with shapes fantastic and grotesque. The white-barked pines and alpine firs lose their identity as trees, becoming mere mounds and spires of white that sometimes resemble strange figures carved by some half-mad sculptor.

The variety of these freakish forms is seemingly endless. Those who first enter this strange world on skis or snowshoes rub their eyes and wonder if they are not dreaming. But it is all very real—as real as snow, ice, dazzling sunlight, and sky more violet than blue can make it. Those who once see the show are wont to make pilgrimages back to this land of "snow ghosts" year after year.

Perhaps one of the most favorable and accessible places for one to view this snow carnival is atop Mt. Stuart, in the Lolo National Forest, near Missoula. Warm



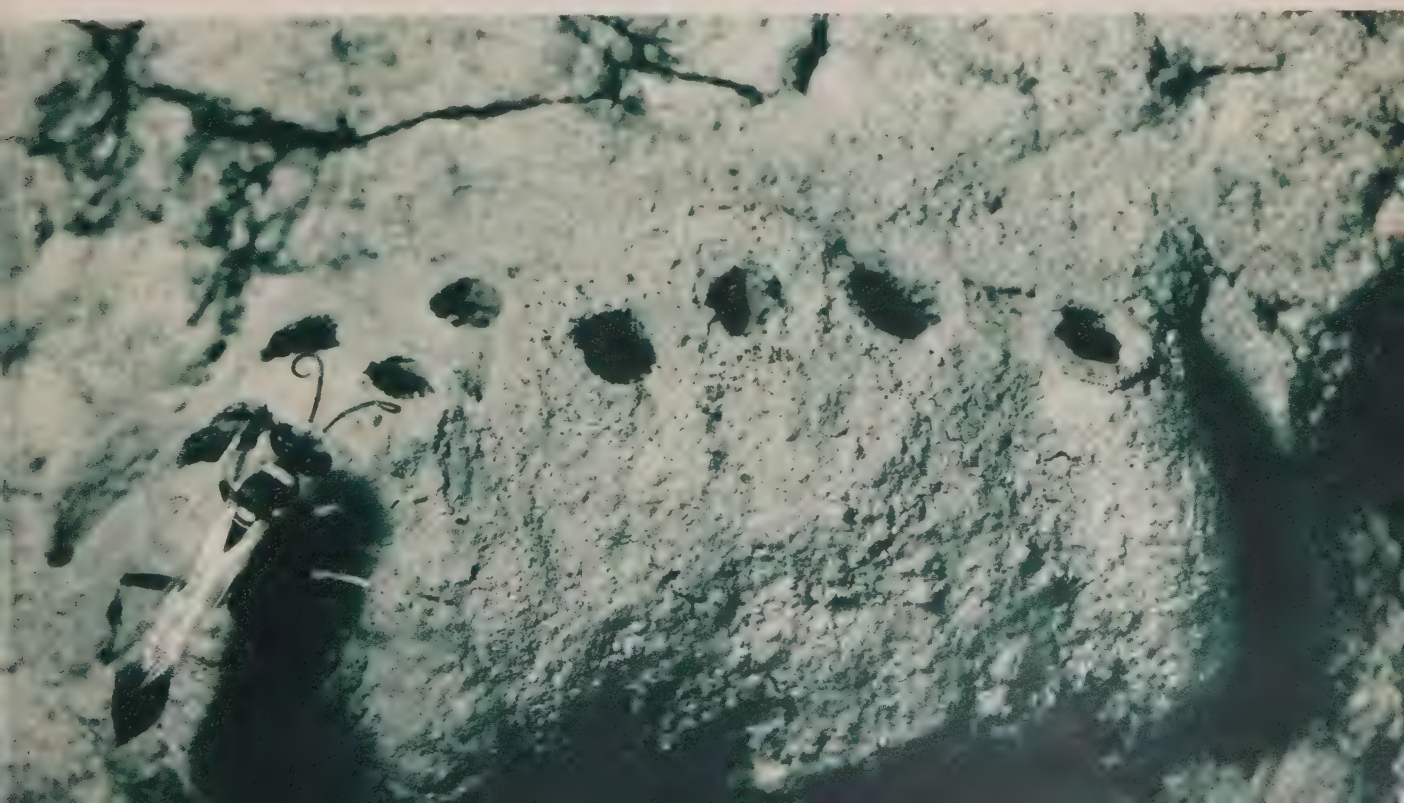
moisture-laden winds from the Pacific frequently bring heavy falls of wet snow to the high country. Then the branches of the larger trees are loaded to the breaking point, and smaller ones are all but buried. Often there comes a period of much colder weather to freeze and solidify the whole. The trees are imprisoned securely in their white armor until the next thaw. Fierce winds, carrying the particles of ice and sleet, etch their shrouds; more snow may come to add to the trees' burdens. Frost feathers often form, growing most rapidly into the very teeth of the gale. One can have nothing but admiration for trees that can withstand the rigors of life at these unfriendly heights; pioneer trees that carry on the struggle for existence along the high frontier of the forest.

March usually brings some recession of winter's onslaughts, and is marked by an occasional warm, sunny day. Then great masses of snow are loosened and fall from the trees. Imprisoned branches are released, and green foliage is seen in pleasant contrast to the white landscape. Tiny icicles now form to sparkle in the sunlight. Sometimes an adventurous chickadee or Clark nutcracker may find its way up from the forest below to explore among the emerging branches. These days bring perhaps the finest show of all the winter season.

A Picture Story of the Mud-Dauber Wasp

As Presented by Lee Passmore

MUD-DAUBERS are among the more interesting members of the solitary wasps. Their nests are in the form of cells molded of muddy clay and are usually constructed under the eaves of out-buildings or attached to the walls and ceilings where they are protected from the rains that would soon destroy them. Spiders, the chief article of food, are stored in the cells of the mud home after being stung and paralyzed by the wasp. The female lays one egg on the last spider placed in each cell, and seals the opening with fresh mud. After a period of incubation of only a few days, the grub hatches out and finds his first meal awaiting him. He feasts on the juices of the spider, moves on to the second and the third, and so on until he has devoured all the spiders in his cell. By this time he is well-grown and fat, and is ready to spin his cocoon, a closely-woven, chocolate-brown covering that is nearly as transparent as Cellophane. Within this self-imposed prison he develops into a creature like his parent. The first photograph on this page shows the common black and yellow mud-dauber, *Sceliphron cementarium,* just as she has finished the first unit of a cluster of mud homes that may number ten or more. Below, the wasp is seen plastering mud over the cells she has constructed most cleverly on the underside of an overhanging rock.



After a portion of the mud nest has been removed, the contents of the six cells are disclosed. The three cocoons at the left contain larvae that can be seen indistinctly through the almost transparent covering. In the center of the photograph is a large larva that has reached the stage where he is about ready to build his cocoon. A large crab spider, *Misumena vatia,* and a small orb weaver, *Epeira strix,* were found in each of the two other cells. A small larva can be seen clinging tenaciously to the leg of the larger crab spider. Although a search was made for the wasp egg that should have been placed on the body of the spider seen in the last cell to the right, it could not be found.

The entire contents of the six mud cells are shown in the lower photograph. The three larger larvae in the top row were removed from their cocoons to have their pictures taken, but the smaller one to the right had not yet spun his silken home. The tiniest larva pictured was not more than two or three days out of the egg. A slight movement was detected in the legs of each of the largest spiders, indicating that they were still alive. All the edible parts of one orb spider had been consumed, but one had been left untouched, evidently because the egg had not hatched. The growing larvae ravenously devour all the soft substances of the spider's body. The strength exhibited by the parent wasp in her task of supplying her nest with food for her prospective young is amazing. The large crab spiders, a favorite delicacy, are sometimes larger and heavier than the wasp. When she arrives at her nest, she forces the victims through the cell openings, which are just large enough to allow access to the mud chamber where they are stored. This feat must often be accomplished while the wasp clings to her nest in an inverted position. The performance of this task almost defies belief, but it is a common occurrence in the life of the mud-dauber.

The pupa in the upper cell of the top photograph can be seen indistinctly through the semi-transparent cocoon. The cocoon was removed from the pupa in the lower chamber to show the position in which most all are found. This specimen was almost fully developed, although the wings were not yet formed. When ready to leave the cell, the insect faces the direction of the opening, illustrating the remarkable instinct inherent in the larva before he spins his cocoon. This photograph is enlarged about three diameters. The larva of the blue mud-dauber, *Chalybion cyaneum,* is shown in the lower photograph, enlarged nearly four diameters. A short exposure was necessary to stop the motion of the grubs. The larvae of this species are smaller than those of *Sceliphron.*

This pupa of the blue mud-dauber was approaching complete development when its cell was opened. It was lying face downward with legs and antennae fully extended, but it was necessary to turn the specimen on its side better to show these organs in the photograph. Many small globules, situated on the abdomen of the pupa, reflected the light that illuminated the interior of the cell. In the photograph below shows a young blue mud-dauber has cut its way out of the cell after completing its metamorphosis. When this picture was taken the wasp's wings were not yet dry enough to support it in flight. It crept slowly over the outside of the nest in which others of its kind were developing. When its wings become stronger, it will make short flights, then much longer ones, and finally find a mate and follow the instinctive habits of the species to carry on the race.

Queen of the Night

Photograph copyright by Gerald Leslie

This remarkable photograph is of a night-blooming cactus, ***Acanthocereus pentagonus,*** one of the rarest and most beautiful wild flowers in America, opening to the midnight moon at The Timbers, Traverse City, Michigan. This blossom measured twelve and one-half inches in diameter. The perfume of this flower is so permeating that it can be detected half a mile away. On the next page is a series of photographs taken at fifteen-minute intervals by Johnnie Martin at Harlingen, Texas, that show the manner in which the flower's bud opens.

THE DESERT CEREUS

By Helen B. Flaws

On the stony desert hillside
When the evening shadows fall,
And the moon in silver splendor
Sheds her pale light over all;
Lo! A flower mean and humble
Flings to night its sweet perfume.
Gaze a while in reverent wonder
At the Desert Cereus bloom.

Just a cactus—but what beauty!
Cut so fragile—snowy white,
Petal's edge faint brushed with purple—
Born to blossom one short night.
Comes the dawn—the sun awakens;
Birds and flowers, all atune.
But it droops its head and withers,
Gone—the Desert Cereus bloom.

Washington's National Zoological Park

Photographs by Arthur H. Fisher

Although the fact is clearly indicated by the name, few of us realize that the National Zoological Park belongs to everyone. It is a *national* park, and, like the National Parks that preserve certain of our scenic areas, is the property of the people. It is administered by the Smithsonian Institution with appropriations from Congress and is much sought by Washington's sightseers. During the year ending June 30, 1936, 2,235,850 persons visited the Zoo, nearly five times the population of the capital city. This represents the country's highest ratio between Zoo visitors and the population of the supporting city. The record for one day's attendance is 8500, achieved one sunny Sunday last spring. Automobiles from Cuba, the Canal Zone and every state in the Union have been seen on the parking grounds.

Dr. William M. Mann, director of the Park, says that the Zoo is like a big wildlife hotel and that the number of inhabitants is always changing. New specimens are brought in, specimens are traded with other zoos, and there is always a certain mortality rate. However, there are always more than 2000 specimens on view.

The first of our pictures, appropriately enough, shows our majestic national bird, the American or bald eagle. This handsome fellow was taken on Kodiak Island, Alaska, and was a gift from N. A. Horner of Seward. He seems quite at home in the huge aviary.

Three large beautiful buildings have just been added to the Zoo. One is the new home for the pachyderms that houses, besides the elephants, the Zoo's collection of hippopotamuses, tapirs, giraffes and rhinoceroses; another is the building for the great apes and small mammals, and the third is a 26-cage addition to the bird house.

The gibbon's new home comprises one entire end of the apes' building. "To really be a gibbon, he needs 30 feet of space to swing in," Dr. Mann says, "so we gave him forty." Because of the fascination of ape antics, three tiers of elevated seats are provided for those who enjoy watching them. In the same building, a special section has been set aside for nocturnal mammals. An artificial moon has been provided and the dark blue glass walls encourage the shy creatures that love darkness to move about.

The large pachyderm house accommodates hundreds of visitors and the cages are placed against the walls in panorama fashion. Each cage has a door that opens into the beast's private "backyard." Impassable moats will encircle these yards, giving the sightseer a clear view without having to peer between bars. Yes, you will be perfectly safe, as the moats are wider than any of the animals could possibly jump, even if they were as interested in getting a close view of you as you are of them. On this page we see the black jaguar, a native of Amazon River, South America, and two African leopards, collected by Dr. Mann in Tanganyika during the Smithsonian-Chrysler Expedition.

A feature of the new bird house will be aquaria for the cormorants, marine birds of fish-eating habits, and the snake bird. This will enable the visitor to watch these birds as they pursue their prey under water. The bird pictured above is the flightless cormorant of the Galapagos, *Nannopterum harrisii,* a species peculiar to that archipelago. It was collected by the San Diego Zoological Society-Hancock Expedition in 1933. Note the rudimentary wing growths that are useless to the bird for flying but aid him somewhat in his submarine forays. The lesser adjutant storks at the upper right came all the way from Java to have their pictures taken. The Japanese macaque (pronounced *makak*) is the model from which the familiar "hear no evil—see no evil—speak no evil" trio originated. The baby puma, pictured below, is a two-month-old cub that was born at the Zoo.

Two European white pelicans and one each of the Asiatic and African rosy species were photographed in this informal group, perhaps while talking over the merits of their respective homelands as compared with their new one at the Zoo. Their present home is a much safer place in which to live even though their quarters are somewhat smaller.

This is the snake bird, also known as anhinga, or darter, who has his own aquarium and fish-pond in the new bird house. This specimen was taken in Florida. Other species occur in Africa, Asia and Australia. This bird is admirably endowed by Nature for under-water work, and its long sharp bill is set with barbs that are invaluable in holding its slippery prey.

The National Zoo boasts two saiga antelope, *Saiga tartarica,* supposed to be the first to be exhibited in America. Formerly of wide distribution over the higher parts of western Asia and southeastern Europe, they are now restricted in Europe to the high steppes between the Don and the Volga. In western Asia some still persist on the Kirghiz and other high plateaus. They are keen of scent and sight, and become nearly white in winter. The function of the swollen muzzle is problematical. In the days of the cave-man this antelope ranged over northern France.

★ Conservation ★

A section of Nature Magazine devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

★

PROTESTATION IS NOT CONSERVATION

It is the fashion for hunters of a certain type to call themselves conservationists. With unwitting though sufficiently sardonic humor this clique asserts that hunters are the only people who have ever done anything for wildlife. The claim is baseless, but disregarding that fact, do hunters help their cause by claiming responsibility for what has happened to wildlife in this country?

The record—their record according to oft-repeated claim—is anything but a laudable one. It consists mainly of a rapid and practically uninterrupted course of extirpation of wildlife since white men first came. Nothing that hunters, prating of conservation, can do, will offset the extermination of one species after another, and the extirpation of numerous others from most of their natural range. Heedless of the lessons of past destructiveness, hunters are at this day extending their record of exterminations. The jacksnipe and the woodcock, birds with limited breeding areas and laying only four eggs, cannot bear up under shooting, yet they have been subjected to it for eighteen years after nearly all of their relatives and associates in the shorebird group were given absolute legal protection. We are even now exterminating many species of wild fowl, and every effort to give these birds the protection they must have to exist is met with clamor for additional privileges to kill.

There is no particle of rationality or sanity in the attitude of hunters toward these vanishing species. How pitiable is the spectacle of hunters using their money and their political power, reaching into the highest offices in the government, to prevent any interference with their slaughtering the last remnants of some of the most beautiful and interesting forms of wildlife with which this continent has been blessed. If basically they are not ashamed to kill for fun, they might at least be expected to feel some remorse that they are destroying the very last individuals on earth of fellow creatures, each of which in its own way enjoys life and this world as much as they.

Conservationists? They are doing their best to make the term a reproach; a mockery. Exterminators is their proper name and all of the protestations either by individual hunters, or by their organizations, cannot avail to conceal their guilt. The only remedy for the situation is to stop killing in every case at the first sign of serious diminution in numbers of its victims. If right did prevail in this world, then the cause of our wildlings would not need pleading, for it is right to foster, to love, and to protect them. If there were an actually functioning power to defend the right against the wrong, our hypocritically self-styled "conservationists" would long ago have been forced to stay their hands. If some power is not found either in their own ranks or in public sentiment that can coerce them, then the drama of life is about played out for many of the loveliest beings that ever graced the earth.

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PUBLIC HEALTH SERVICE VERSUS "DING" DARLING

In the October issue of Nature Magazine there appeared an editorial in which we quoted excerpts from an editorial published in *Outdoor America* for August, 1936, by J. N. Darling, former head of the Biological Survey. Mr. Darling attacked the U. S. Public Health Service for requesting eleven million dollars to drain certain areas in the state of Maine "under the obviously false pretext of 'controlling malaria.'" Mr. Darling declared that there is not and never has been any malaria in that state, that such a project could do tremendous damage to wildlife nesting areas, and that a total of $41,500,000 was requested for similar projects in states where indigenous malaria is unknown among local diseases.

Surgeon-General Thomas Parran of the Public Health Service, in answering this charge in the October *Outdoor America,* declared that Mr. Darling's statements were "absolutely false and . . . without any foundation whatever in fact. . . ." According to Surgeon-General Parran, the Public Health Service "has not expended nor has it proposed to any other agency the expenditure of a single dollar for malaria control or drainage. . . ." He explains, however, that during the past three years the Service, in cooperation with the Works Progress Administration and the sixteen states in the malaria belt, "has given its assistance on the technical supervision of local malaria projects for the very purpose of insuring that the work was confined to areas where the disease was a serious problem and of insuring that the work was done properly. . . . The expenditure by the Service for this work has amounted to less than $1,000,000."

Mr. Darling, of course, did not maintain that the Service had *spent* eleven millions for malaria control in Maine; he merely stated that the Service had asked for it. To this the Surgeon-General replied that his department had no knowledge of any malaria control-drainage projects outside the malaria belt. In fairness to all concerned, following a search for facts that would disprove Mr. Darling's allegations, it should be recorded that a letter from the Acting-Surgeon-General to the editor of *Outdoor America* stated that "It is understood that some applications for local drainage projects for various purposes were submitted to the Works Progress Administration by various local governmental agencies in some of the New England States. The Public Health Service had no connection whatever with these applications. . . ."

Again, the minutes of a meeting of the sub-committee on drainage policy and projects held last May to consider WPA work, shows that one member of that committee questioned the large number of malaria control projects scheduled for northern states. Representatives of the WPA and the Service attending the meeting explained that "malaria control" was the term used in connection with such projects because they believed "mosquito-pest control" would not meet with approval at WPA. For this reason the title "malaria control" was allowed to stand. This explains Mr. Darling's logical interpretation that figures for impending WPA drainage projects were approved by the Service.

The evidence shows that the Service did not request funds for malaria control in Northern states and we are glad to make this clarification.

However, it also should be made clear that drainage can be damaging to wildlife no matter under what name such drainage is carried out. Drainage of certain areas is necessary in the interest of the health of the nation only when the consequent loss of wildlife environment is justified.

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WHAT IS ★ ★ ★ PROSCRIPTION?

Just an old Roman custom—of a piece with the gladiatorial combats, which we speak of as characteristic of that decadent civilization. We, with our crowds who throng to sporting events where there may be maiming and killing, are not so different after all, and in the name of sport we still have proscription. The word means publication of the names of those outlawed or condemned to death. The proscribed of today are not men but much smaller creatures who cannot fight back. They are not constituted like men so that relatives of the fallen may wreak vengeance upon persecutors. No, it is entirely safe to wound or kill them, a wonderful opportunity for bullies.

The proscribed of today need not be named individually for they are condemned under one blanket designation as "vermin." Upon analysis it appears that "vermin" are animals, all much smaller than man, which to live themselves may kill some other creatures that man wants to kill for fun. Proscription in the Roman sense was mild compared to the treatment meted out to "vermin." Then an individual might be removed for the good of the removers, but in "vermin" proscription the whole race is condemned once and forever. No inquiry is made as to individual guilt; all are murderers; all must be killed without fail.

In a recent sporting magazine appears the question: "What would you say Mr. Birdhunter if several millions of hunters were licensed to take game, day and night, in any manner they chose for the entire year?" The reference is to "vermin" and the answer is assumed to be so emphatic and unanimous that the questioner feels justified in summing up, "If we want game in the country we must control the killers." Now "game" includes the creatures killed for fun, so to the sportsmen, apparently, there is no wildlife other than "game" and "vermin," and no persons with a valid interest in the matter but themselves. In this they are absolutely mistaken, and they may well be asked—if it is so great a crime for "vermin" to kill "game," then why is it not an equal crime for hunters to kill it?

So far as Nature is concerned, the cases are just alike and all real friends of wildlife will not differ from Nature in that judgment. If "vermin" killing of game calls for proscription and death what can be said of hunter killing? Before the bar of the Universe there is no special pleading that can serve to reduce the guilt of the hunter as compared to that of "vermin;" in fact all legitimate argument favors the side that kills out of necessity over that which kills for fun. If hunters were meted out the same punishment, which, like the Romans, they inflict not as justice but simply because they have the power, their race would long ago have been extinct.

The Decline of the Sea Otter

A sorry tale of wholesale wildlife destruction

By C. L. ANDREWS

THE North Pacific Ocean was fast becoming an uninhabited waste through the almost complete destruction of the whale, the walrus, the fur seal, and the sea otter, and the rapid decimation of the halibut, when a halt was called at the beginning of the twentieth century.

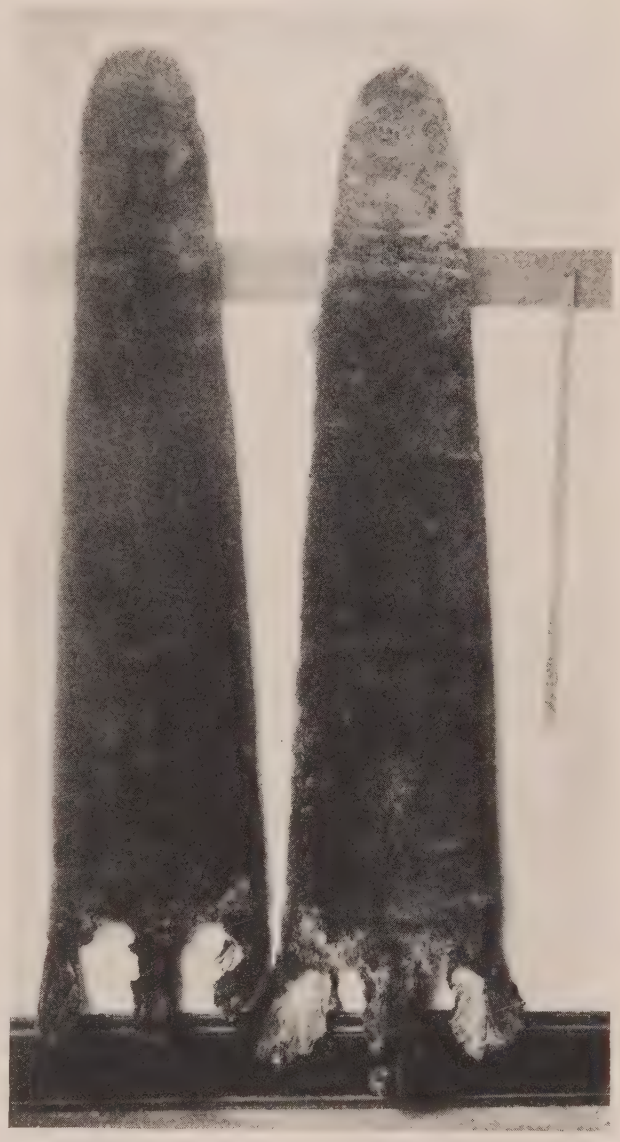
One of the most marked examples of the sweeping of wild life from the face of the sea was that of the sea otter, *Latax lutris,* of which we have a record of nearly two hundred years of exploitation.

When Bering's crew returned to Petropaulovsk in 1742 with some nine hundred sea otter skins stowed in the forty foot boat that was built from the wreck of the "St. Peter", a mad rush of the skin hunters and traders of Siberia, later known as the *promishleniks,* was begun. With the Aleutian Islands as their goal, they sought by all means, either foul or fair, to gather the precious pelts highly valued by the Chinese. In a lawless horde they sailed from island to island in frail boats, hunting the sea otter.

Shelikof, a far seeing trader who fitted out ships for the lucrative trade, saw the imminent result of this promiscuous pursuit of plunder, and formed a plan of settlement and control of the business by a less destructive method. He planted a colony on Kodiak Island and made a move toward a concentration of the industry of the region into a great company. Shelikof died before his object was accomplished, but the work was carried on by his son-in-law, Nicholas P. Rezanof, who secured the charter of the Russian-American Company in 1799 from Emperor Paul.

Under the management of Shelikof, and continuing under the Russian-American Company, Alexander Baranof, as chief manager of the work in the Colonies, organized a fleet for combing the seas for the sea otter. He adapted the wonderful little skin boat, called *oolootah* by the Aleuts, and *kyahk* by the Eskimos, into the bidarka, which carried two hunters or two paddlers and a Russian overseer or *partovschik.* These bidarkas he formed into a fleet manned by the skillful Aleut or Kodiak boatmen, and with them literally combed every square mile of ocean.

In addition to this efficient machine of the energetic and competent Baranof, the English and American traders had come around the "Horn" from the Atlantic to the Northwest Coast of America, and were spurring the inhabitants of that region to gather the skins for their trade in the Chinese markets. By the beginning of the Nineteenth Century Baranof was compelled to send fleets of his bidarka men down to California to gather pelts to satisfy the ever increasing demands of the stockholders of his company for profits. He left the Colonies in 1818, but the company he had created still operated,



SEA OTTER SKINS

The yardstick hanging beside the pelts shows the great size of these sea animals. An average of 5,000 per year were taken from the waters of the North Pacific from 1881 to 1890

and by 1830 the sea otter was so diminished that Baron Von Wrangel, then chief manager of the Russian-American Company, foresaw its extinction if the decrease was not checked.

The danger of extinction had been noted in 1806 by Nicholas P. Rezanof, when he came to the Colonies. He saw the slaughter, and advocated a change in methods to conserve the supply. But conditions were against it. The English and American traders, called "King George Men" and "Boston Men" by the natives along the coast, could not be controlled. The *promishleniks* did not wish to be limited in the take of fur, as they were all working

on shares. They scouted the idea of depletion. "The sea otters have gone to other grounds", they declared. "When the cod are all gone from Arkangel, then the sea otter will be gone from America." But the sea otter kept diminishing. There were no other waters to which it could go.

Wrangel restricted the catch. He allowed no part of the hunting grounds to be used for two consecutive years. From 1842 to 1862 the take averaged only 1249 per year, including that of the Kuril Islands. The total for the twenty years was 25,899. (*Tikhmenef's Historical Sketch of the Russian-American Company.* Part 2, p. 221.)

The result was to restore the sea otter to nearly its original abundance in the northern waters before the United States bought the country we call Alaska.

Then began an orgy of slaughter. The careful methods of the Russian company were cast aside. It was a scramble for every sea otter whose head was seen upon the sea. From 1881 to 1890 the take was 47,842 or nearly five thousand a year. The beasts were shot from the shore with long range rifles, the hunter trusting to fortune and the waves to bring the pelt ashore. They were netted along the craggy headlands. They were pursued in schooners, the "Sea Otter Fleet", in which each boat carried a fleet of bidarkas, and men to man them, on the deck, ready at a moment's warning to slip their little skin canoes into the water and to surround any head that they saw on the sea.

The result was that the Alaska Commercial Company, the American corporation that had secured the practical control of the fur of western Alaska, had to close four or five of its posts by 1897. In 1900 the company was able to secure but 127 skins, and by 1910 the whole catch in Alaskan waters was but 31 skins, although 16 schooners sailed the sea in the "Sea Otter Fleet". The price in China had risen from about sixty rubles a skin in 1778 to as high as $1000 in 1910, but even at the increased price there was no profit in the pursuit. It was clearly seen that unless drastic measures were taken, the sea otter would soon be as extinct as Steller's sea cow and the saber-toothed tiger. The greed of the hunter was determined to take the last pelt from the seas.

Finally came the law of 1910, forbidding all citizens of the United States to take the skins in waters of the North Pacific north of the 30th parallel under penalty of fine and imprisonment with forfeiture of ship and tackle. A treaty was negotiated in which other nations joined, making it binding on their subjects to observe the law. A quarter of a century has passed and the waters bordering the Aleutian Islands, the favorite home of the sea otter, are just beginning to be restocked. It will be years before the number will at all approach the former abundance.

In the coastal waters from southeastern Alaska to Lower California, where the animals were once plentiful, practically none have appeared. In traveling from Los Angeles to Unalaska during more than forty years, I have seen only one sea otter. In 1800, in the coastal coves of the islands of Southeastern Alaska, they were so plentiful that their heads on the water were described as like flocks of birds.

The catch from 1868 to 1900 was 106,299, according to Government records. How many were lost by wasteful methods is not known. At $100 for each skin this would be $10,629,900. Had the supply been kept at the number there were in Alaskan waters in 1867, there could have been 2000 a year killed perpetually, amounting to $200,000 worth annually.

Thirty-six years have elapsed since the beginning of the century. At the above figure each year this would exactly have equalled the purchase price of the Territory, $7,200,000. This is the cost of our folly.

KODIAK, ALASKA, ONCE THE CENTER OF THE SEA OTTER INDUSTRY

Through this channel the brigades of hunters from the Russian-American Company went out to search the sea. In the foreground lies the wreck of an old sea otter schooner

Wildlife Institute States the Case

BURNING THE CANDLE AT BOTH ENDS

Wildlife for the Future and *The Dollar in the Duck* are the titles of two booklets recently issued by the American Wildlife Institute with headquarters in the Investment Building, Washington, D.C. Both these are beautifully conceived physically and carefully written and edited. Both are presented from the point of view of the sportsman, and designed for the intelligent sportsman and for business men who have a stake in the revenues derived from hunting and fishing.

Wildlife for the Future combines an outstandingly effective pictorial display with a concise statement of the situation of our wildlife. It points out that "these are critical times for the wildlife of this country, and for all who know the value of wildlife to the health and happiness of the people. . . . It is realized today—as it was not, yesterday—that this nation's supply of natural creatures is no inexhaustible mine of wealth to be taken for use without replenishment." Faced with this situation, the American Wildlife Institute asserts that it is not alone concerned with the conservation of our few remaining wildlife resources but that it aims at the restoration of wildlife in abundance.

Pointing to the importance of research, the Institute's brochure says:

"All species, however, can be produced in the wild by improving their environment. Granted a favorable environment, the natural increase of wildlife is rapid. Nature automatically builds up the population of her creatures to that point where sustenance begins to fail them, where disease or natural competition assails them, or where predators are attracted to destroy them.

"To improve the environment of wildlife there must be far greater knowledge of the factors which locally make for the life and death of each species; what each requires in the way of food and cover during each season; what enemies, disease, and competitors each can endure. Some species of wildlife prey on others. For any given species, the methods used to increase it in different localities are seldom the same.

"Existing knowledge of how to appraise and improve environment is sufficient so that a start may be made at increasing a few species in some localities. Available knowledge is insufficient to serve as a base for any real national program of wildlife restoration."

We cannot quarrel with these statements. In fact we have urged this same view in objecting to campaigns against predators based upon insufficient knowledge. Yet these campaigns, furthered by the arms and ammunition manufacturers who are heavily represented on the American Wildlife Institute's Board of Trustees, are eagerly embraced by sportsmen's groups faced with a scarcity of game birds and mammals at which to shoot.

In fact, it is rather what these booklets do not say rather than what they do say that merits consideration. Every cause for wildlife diminution is cited, from over-grazing to disease, except that made by the man with the gun. It is assumed that he may go on shooting in large numbers —and these numbers are thoroughly cited in support of the argument that hunting and fishing are an important economic asset—while the research essential to a program of restoration is being carried forward. No phrase in either booklet mentions even the least further restriction on hunting, or suggests the possibility of further extermination of species through over-shooting before the program can become effective.

We cannot escape the feeling that this is a studied evasion and that the reason for it lies in the second brochure, *The Dollar in the Duck*. This is a direct appeal to the American business man to support the American Wildlife Institute. This plea is based upon the amount of money spent annually for arms and ammunition, fishing

tackle, automobiles, tires, gasoline, equipment and many other things in the pursuit of wildlife. The Institute is eminently consistent, therefore, in evading the question of temporary vacations from shot and shell for wildlife —which belongs to all of us and not the hunter or the business man—in order that Nature herself may have a chance to build up reduced and endangered species.

We consider it distinctly unfortunate that the Institute has not broadened the appeal expressed in these brochures in accord with the views of persons and organizations interested in wildlife for reasons other than commercial. It is true that in its publicity the Institute has always rather consistently considered none but the interests of sport and commercialism. In its lists of directors and technical advisors, however, we find the names of a few men who are nationally known to consider the esthetic attributes of wildlife as more important than the commercial. But their views are not registered in these brochures, although the opportunity is there. Thus, five hundred million dollars is stated to be spent annually by New England's visitors. Of Maine's share, adapting the Institute's figures, at least 65% comes from non-hunters and non-fishermen. Applying this factor to the neighboring states, we find that nearly 2,000,000 persons potentially interested in wildlife, but not wishing to kill it, spend $330,000,000 merely to look for what remnants are left for them by the other 35 percent—hunters and fishers. Is not the greater sum spent by those seeking non-destructive enjoyment as important, dollar for dollar, as that spent for hunting and fishing? And is it taken for granted that this majority are so foolish that they will continue to be satisfied with the meager remnants, yearly becoming smaller, that remain of New England's former wealth of wildlife? The well-being of many communities depends on the answers. R. W. W.

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Finishing the Mammals

THE Emergency Conservation Committee, with the capable editing of Mrs. C. N. Edge, chairman, has come forward with another thought-provoking pamphlet with the above title. In twenty-five concisely-written pages, it tells what the wild creatures of our country are up against in their hopeless attempt to avoid the steel traps of the fur trapper, the shot of sportsmen and the bounty collectors, and the poison of the "vermin" hunter. The propaganda spread by ammunition manufacturers is labeled as a "shameless campaign" against wildlife, and figures are quoted to show that a majority of so-called "vermin" killed as a result of these campaigns have been species beneficial to man.

The unbalancing of Nature's program usually results disastrously, and a typical example of what happens when this is done is related in a series of events that occurred in the Kaibab forest region in Northern Arizona. First, the cougars of the area were killed off because it was known they destroyed a share of the deer inhabiting the region. Their only check removed, the deer multiplied rapidly and consumed more forage than the area could provide. When winter came, hundreds died from weakness and starvation and those that survived ate every twig and leaf they could reach until the country looked as though a swarm of locusts had passed through. This was in 1924. As an only cure, the region was thrown open to deer hunting and their numbers were greatly reduced by 1930. According to a news release from the Department of the Interior, "it will take more than fifty years of careful management to cover the scars of overgrazing caused by the over-population of the deer."

The booklet also attacks bounty-payment policies adopted by several states. It is a well known fact, it is pointed out, that bounty laws are "beaten" by importing "scalps" from other states. When the requirements do not strictly define the part of the animal to be presented for bounty payment, many "scalps" may be made from a single animal. In many cases bounties are paid on mammals that are useful in checking mice and other enemies of the farmer.

The Emergency Conservation Committee will be glad to supply any of the series of conservation pamphlets available. They can be obtained by writing to Mrs. C. N. Edge, Chairman, 734 Lexington Avenue, New York City.

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Wild Life Committee

THE COMMITTEE on Wild Life of the Division of Biology and Agriculture of the National Research Council has been reorganized. The personnel of the present Committee follows: H. E. Anthony, Chairman; Charles C. Adams, Henry I. Baldwin, R. E. Coker, William S. Cooper, Herbert C. Hanson, G. E. Nichols, Edward A. Preble and A. H. Wright.

The intimate relation that exists between wild creatures and our civilization is emphasized by modern developments, in that the encroachments of agricultural and industrial interests have resulted in continuing diminution of the areas available as natural habitats. As an example, there is the all-too-prevalent practice of governmental and other agencies of "cleaning up" natural areas in their emergency projects. Other demands of increasing human populations are continually exacting a greater toll on our birds and other wild creatures. The danger of their over-exploitation by the devotees of sport, with its commercial accompaniments, is particularly serious. Recognizing these facts, the Division considered it best to reflect the need for permanent preservation of habitats in the title of the Committee, which now becomes "Committee on Wild Life and Nature Reserves."

It is the earnest hope of the officers of the Division of Biology and Research that the studies of the newly appointed Committee will help to rally the forces favoring the permanent reservation of important natural areas, in an effort to counteract, as far as may be, the harmful effects of unwise drainage, the destruction of the vegetative cover of natural habitats, and the undue exploitation of our native wild animals and plants by commercialism.

THEY CALL ME A WISE, OLD BIRD. WELL, HERE IS A WISECRACK! YOU CAN JUDGE THE LEVEL OF CIVILIZATION REACHED BY A PEOPLE FROM THE WAY IN WHICH THEY TREAT ANIMALS.
WHAT WE NEED IS PRESERVATION NOT CONSERVATION
TO BE OR NOT TO BE? I TOO COULD A TALE UNFOLD ABOUT BAYING HOUNDS AND FOULEST MIDNIGHT MURDERS
I AM THE EMBLEM OF MY COUNTRY, BUT NOW THEY ARE HUNTING ME WITH AIRPLANES SOON I'LL BE A MYTH LIKE THE DOUBLE HEADED EAGLE OF HERALDRY.
GHOST OF THE LAST PASSENGER PIGEON. OBIT 1914
IN THE EARLY DAYS THERE WAS A PLENTY OF GAME ON LAND AND WATER AND WE WERE MORE NUMEROUS THEN THAN NOW SO IT WAS EASY TO PICK THEM
NO WONDER, I AM A WILD CAT
LEONARDO DA VINCI SAID "MAN IS THE GUARDIAN OF THE ANIMAL WORLD" BUT LEONARDO WAS NO HUNTER - JUST A GENIUS
THE COLLEGE BOYS GET MY COAT
EVEN THE SAVAGE INDIAN HUNTER RESPECTED US.
KILLMORE CLUB GOOD SHOOTING OVER BAITED WATERS
IF WE ARE VERMIN, WHAT ARE THEY?
DUCKS IS GITTIN' MIGHTY SCARCE, SAM
Y'RE TOOTIN' RIGHT, BILL. TOO MANY CROWS, HERONS, FOXES, AND OTHER VERMIN AROUND. WE GOT TO CLEAN UP ON THEM AGAIN.
SUDDEN DEATH ARMS CO. KILL THE VERMIN! BUY OUR "STINGER" RIFLE WITH TELESCOPE SIGHT. GETS THEM AT 300 YDS. KILL CROWS, WOODCHUCKS, HAWKS, KINGFISHERS, HERONS, BOBCATS, OWLS, EAGLES, MAGPIES, BEARS, COONS, WEASELS, SKUNKS, JAYS, TURTLES.
DECOYS
PH. NUGRA
THIS IS WHAT MAKES A BITTERN BITTER
WE KILL TO LIVE, THEY KILL FOR SPORT
VERMIN OR GAME, IT IS ALL THE SAME
I CAUGHT A DUCK ONCE
WHITTIER SANG ABOUT ME
I CARRY A BREECH LOADER TOO
FELLOWS, GROW A PIN-CUSHION LIKE MINE AND THE DOGS CAN'T GET YOU
A. O. LEUTHEUSSER

"VERMIN" LOOKING AT HUNTERS

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When the November, 1936, issue of the *Nature Study Bulletin* of the St. Louis Nature Study Society came to hand we were immediately in-gued by the effective cartoon printed above. It was awn by Arthur O. Leutheusser, principal of the Irving hool, St. Louis, and an ardent conservationist. We be-ve that this cartoon expresses in pictorial form the fal-lacies of the current drive against so-called "vermin." It does so more effectively than words, and we thank the St. Louis Nature Study Society and Mr. Leutheusser for the privilege of reproducing it here. In the St. Louis schools this cartoon has been used effectively by having the pupils study it and note the remarks made by the various animals, and summing up their impressions in a brief essay.

"Hamburgers —500 Feet Ahead"

BILLBOARD "BEAUTIFICATION" OF THE DELAWARE WATER GAP HIGHWAY. THE APPROACHES TO THE GAP, AS TO MOST OTHER EQUALLY SCENIC SITES, HAVE BEEN RUINED BY THESE PARASITES. AT THE LEFT WE SEE A TYPICAL NEST OF BOARDS. IF YOU STOP AND GET OUT OF YOUR CAR YOU CAN GET THIS VIEW OF THE RIVER SHOWN BELOW.

THE November issue of the *Roadside Bulletin*, an educational publication devoted to rural roadside signboard eradication, has chosen Pennsylvania as its current "horrible example" in its campaign to beautify the environment of the highways of America. The billboards are pointed out as a menace to safety, one case in point being a large "drive safely" display on a hairpin curve when motorists' eyes should be on the approaching traffic. The *Bulletin* terms this "a strange method of promoting safety—a method that defeats its own purpose." As to the effect of this method of advertising on the scenic beauty of the countryside, the survey of Pennsylvania highways shows much abuse. Between Schellsburg and Bedford, for example, there is an average of one sign every four seconds. A motorist travelling between Pittsburgh and Philadelphia, in 167 miles of purely rural road between towns, has 2017 signs forced upon his attention. The *Bulletin* calls upon the people to throw off lethargy and compel the billboard industry to respect the rights of the people. Warning is given that restriction of outdoor advertising will not come about through cooperation with the billboard industry. "This has been tried repeatedly and has always failed," the *Bulletin* says.

Conservation-minded individuals, garden clubs, women's clubs, and anyone interested in roadside beautification may have copies of the November *Roadside Bulletin* for 10 cents each, one dollar per dozen, or five dollars per hundred. State and County Roadside Councils may have them at cost, thus enabling them to supply their members with their own reports, which, together with those from other sections of the country, are incorporated in the *Bulletin*. Address inquiries to the National Roadside Council, 119 East 19th Street, New York City.

Publication of the issue of the *Roadside Bulletin* reviewed above was made possible through a contribution from educational funds of the American Nature Association to defray printing costs. This contribution reflects the conviction of the Association that regulation of unsightly commercialism along the rural highways of the United States is a vital part of the conservation of our natural resources in rural beauty. Beside offending in an esthetic way, rural billboards are at last coming to be recognized by highway authorities as an important contributor to the terrific toll of human lives taken each year in highway accidents. The distraction of billboards, placed along the highways for the express purpose of attracting—and, therefore, distracting—attention, must be curbed as a part of the drive for highway safety. Curves and intersections are favorite spots for billboards and in such places they are criminal menaces to human life.

Things to Think About

By unanimous vote of the full membership of the Conservation and Development Commission of the State of Virginia a resolution has been adopted urging the General Assembly to adopt legislation drastically curbing billboards and other outdoor advertising in rural districts. The Commission declared that in handling this problem the interests of the few should give way to the interests of the many.

The *Puget Sounder* is a monthly newspaper brought out by Farrar and June Burn at Bellingham, Washington, with offices at 115 Olympic Place, Seattle. It has a splendid conservation philosophy and policy that is guaranteed by the fact that it is the official organ of the Northwest Conservation League. The League, in turn, has offices at 6224 25th Ave., N. E., Seattle. We commend both the newspaper and the League to the attention of conservationists in the Northwest.

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Dr. H. L. Shantz, Chief of the Division of Wildlife Management of the United States Forest Service, summarizes the aims of his Division thus: (1) to build up the wildlife habitat; (2) to increase the wildlife population; and (3) to manage wildlife so as to establish a sustained population. The key to the success of such a program lies in item three, and achievement will be in proportion to success in keeping special and selfish interest, political pressure and local sporting greed in check.

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An interesting commentary on our wildlife is to be found in a recent release of the Wisconsin Conservation Department that reports "a great reduction in the kill of illegal deer." In our naïve way we had not realized that deer were illegal, although the way in which they are pursued does suggest that they are regarded by a certain element of our population as criminals that must be eliminated from society.

From the Indiana Department of Conservation comes the announcement that the fourth annual "Crow Control Contest" gets under way January 1. Awards totalling $425 will be made to the five clubs who turn in the most crow feet in the five months of the contest, and an additional award of $50 will go to the club killing the most crows during the entire contest.

Since there are so few game birds left to shoot at, and the United States is not expected to engage in war in the near future, some way had to be figured out whereby the ammunition manufacturers could keep up their volume of business. No sales means no advertising in the "sportsmen" magazines, you know. Many sportsmen's and other outdoor magazines, endeavoring to keep the shell makers' advertising business, sanctioned crow shoots, as so aptly told in Ellsworth D. Lumley's article in our December issue, and several states, and now Indiana, to help the cause along, offer cash awards for crow killings. The corn borer and the grasshopper, two of the farmers' major enemies, deeply appreciate these contests, we are sure.

And to top it all, Indiana will release one quail or pheasant for each 100 crow feet that are turned in by participating clubs. In other words, "kill the crow that destroys our game birds and kill the game birds too."

A correspondent who signs himself "Deer Slayer—1936" writes to the editor of the *Milwaukee Journal* describing his experience as a nimrod. His letter tells its own story, and tells it well. Here it is:

Well, at last I'm a sportsman! This was my first deer hunt. And unless my conscience develops callouses before another hunting season comes around, it will be my last.

Anyway, one of the guides said, "You stand there and don't move." There was a big tree hollowed out by a forest fire and I stepped into the hollow to wait, expecting at any time to be bagged for a bear by another equally inexperienced huntsman. The writing of this letter bears mute testimony of the fact that we were the only hunters in the woods that morning.

Getting back to my story, I stood there freezing, wondering if the guide knew how many were in our party and secretly knowing that he'd never be able to find where he had put me. Suddenly I saw a pair of hat racks coming toward me about 20 feet away. I didn't know whether the sportsmanlike thing would be to grab him by the horns or shoot at him. Anyway, he had not seen me and was still coming.

I began to feel guilty, so I stepped out and flagged him down. He spun around and I couldn't catch him by the horns, so I shot at him. He dropped in his tracks. I walked over and he lay there panting, but he turned and gave me a withering look just before he died which seemed to say, "What in h—l did I ever do to you?" Well, if I could have put him back on his feet and sent him on his way, or have taken his place there on the ground I would gladly have done so.

The guide came up in a few minutes and slapped me on the back. "Nice going! Now you're a real sportsman! You'll have to have that fine head mounted."

"Oh, I will, will I?" I came back. "And then I'd have those two soft eyes looking down off the wall at me and saying, "The brains of this crowd is right up here on the wall between these two antlers, but you had your fun, sport. No hard feelings. My head will be up here on the wall when you and your gun are no longer memories."

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On the subject of deer and sportsmen may we record the struggles of a valiant deer hunter as recorded in the

New York Times. The story speaks for itself; in fact, it shouts:

A deer hunter near Lindsay, Ont., fired all the shells in his gun at a young buck and then was forced to pick up a club to withstand the onslaught of the infuriated wounded animal, reports a special correspondent of *The Toronto Globe and Mail.* The hunter's dog drove the deer into a lake and out into a bog. The animal sank to its knees in the mud, and, armed with a heavy club, the hunter pushed out two logs and walked toward the deer.

He hit the animal a terrific blow on the head, but the deer lowered its three-foot antlers, tossed its head, knocked the club from the man's hands and flopped him into the sticky mud. He sank to his knees beside the deer.

A short, husky man, he grappled the horns and, with one foot on the lower antlers, pushed the head of the deer into the mud. Finally he managed to whip out his hunting knife and bury it to the hilt in the flank of the animal, ending the struggle. The hunter then extricated himself from the mire with difficulty, having sunk to his hips. The deer weighed 300 pounds.

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Another deer story is found in the *New York Sun,* effectively setting forth the actual opinion of the non-hunting majority of our citizens:

The car was parked on Forty-second Street and soon a good-sized crowd had gathered to look at the unusual overflow. On either fender and on the trunk rack at the back were hitched buck deer. Two men and a girl sat in the car, with the windows closed, and they seemed much pleased at the attention they were attracting. However, had they heard the remarks of the crowd they would have felt differently.

"The idea of shootin' such young animals!" said one man, looking at the one on the back, a deer not much bigger than a police dog.

"They ought t' be shot themselves," exclaimed an indignant woman. "The authorities shouldn't allow them to slaughter defenseless animals who do no harm."

"Big game hunters," said another man, laughing. "I bet they rode through the forests in their cars, blinded the poor beggars with their headlights an' shot 'em down at a three-foot distance."

No one showed any enthusiasm for the exhibit—instead there was nothing but disgust and disdain for the hunters and their prey.

The equivalent of seven fish for every person in the United States will be planted in 1937 by the Wisconsin Conservation Department, according to department director H. W. MacKenzie. This means that 1,000,000,000 frys and fingerlings will be placed in Wisconsin's thousands of inland lakes and streams. The billion figure will be a record number never before approached by any state in the country in fish plantings, and favorable weather conditions for spring spawn gathering will make it possible, Mr. MacKenzie says. In keeping with Wisconsin's long-range program of active conservation, the Department for more than 30 years never has planted less than 100 million fish yearly. Development of portable pure oxygen aerating tanks for live fish transportation is one of the major reasons why Wisconsin has set its fish stocking goal at the hitherto imaginary figure of one billion.

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Missouri is on the road to an enlarged and improved conservation program, reports Professor R. H. Westveld of the University of Missouri. By a vote of approximately 3 to 1 the electorate of the State acted favorably at the November election on an amendment to the state constitution that provides for the appointment of a four-man Conservation Commission. The commission, appointed by the Governor, will name a Director of Conservation who will be responsible for all conservation activities. The new organization will replace the Fish and Game Commission that has control over wildlife conservation and the administration of state parks. The wide margin by which the amendment passed is indicative of the favorable sentiment toward conservation that the work of the C.C.C. and the establishment of the national forests have developed throughout the state, Professor Westveld believes. Only one county of the 114 in the state voted against the amendment.

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EDITOR, NATURE MAGAZINE:

When men now seventy years of age were born, there were swamps and ponds on almost every farm. They were Nature's reservoirs to catch the melting snows and April's rains, and by holding back the water prevent floods and droughts. From them trickled the rivulets which made the creeks which quenched the thirst of pastured cattle and gave swimming holes to boys. They dampened the air that cooled the breezes of summer days and gave refreshing dews to nights. Their moisture was taken up and carried by clouds from place to place and sprinkled on thirsty land.

Sixty years ago tile drainage of low lands was getting under way, and progressive farmers were laying tile. The swamps and ponds became rich black-soil corn lands, that made their owners rich, until they produced too much and broke their market. Wild hay gave way to timothy and clover and to alfalfa. The Angus and the Shorthorn, the Jersey, Guernsey, the Ayrshire and the Holstein have taken the places of the rustling Longhorn, and the family cow.

Two generations of science, efficiency and progress have come and gone since tile drainage was begun. The reservoirs of swamps and ponds have been destroyed. Provision has not been made to carry on their work. The cost of lack of foresight now is being paid. Spring's wasted waters rush to rivers and to seas, ravaging their torrential ways. Throughout wide areas there is no water held to cool the blistering air, and irrigate the land in summer time. Dry air robs plant growth of moisture, instead of giving it, and vegetation withers without making crop. Cattle die because of lack of water-carrying clouds. Erosion scars the face of parched soils and fertility is blown away in stifling dust. Civilization's change of Nature's plan is showing some mistakes of science and of greed.

After more than fifty years of waste and robbing, there is talk of returning to Nature's plan and restoring, by building dams, the reservoirs of moisture that were had in swamps and ponds. So turn the wheels of time. The seeming wisdom in the prospect of one generation sometimes becomes error in the retrospect of another.

MARK W. POTTER

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A six million dollar appropriation from Congress made it possible, during the past year, for the Bureau of Biological Survey to establish 214 wildlife refuges in the United States, including Alaska, Hawaii and Puerto Rico, according to the annual report made by Ira N. Gabrielson, chief of the Bureau. In addition to the 55 waterfowl refuges, three big game ranges with a total area of 3,020,671 acres were set up on the public domain in conjunction with the organization of grazing districts under the Taylor Grazing Act. The C.C.C. men of 28 different camps helped greatly in developing these areas, the report said.

BOYS AND BIRDS ARE FRIENDS

The problem of moulding young America into real conservationists can be solved by early training

By PHYLLIS FAIRFIELD

ONE day in early May I stopped to call upon a friend and found her excitedly waving a letter, obviously upset about something. "Willie and Freddie and Annabelle," she announced in breathless despair, "are coming to pay me a long visit."

"But," I said, surprised, "I thought you adored your niece and nephews and never could see enough of them."

"Oh, I do," she wailed, "but just now, in the spring, with the birds all coming back, and the cardinal already nesting over the gate where I never can hide it from them, and the baby robins ready to hatch on the window sill . . . Oh dear! I dread it."

AN UNLUCKY FLEDGLING IS RESCUED FROM THE POOL
Taught that birds should be protected and not hunted, these youngsters are absorbing a background of true conservation principles

I looked at her in complete astonishment. Here, it seemed, was a lady who had never heard of the Nature studies of the Boy Scouts; of the "bird walks", the charts, the bird lectures, and the emphasis on the importance of bird life which is a part of child teaching from kindergarten all the way through high-school.

To her, a boy is a boy, a gun is a gun, and a bird is a moving object—a challenge to the boy with the gun. Put them all together and the result—a pitiful bunch of falling feathers, and a horrid smirk on the face of the boy.

The fact is that in our town, as well as in many others, no boy is allowed to own an air rifle, much less fire it indiscriminately; a precaution meant not so much to protect the birds as to prevent our having a one-eyed population. However, it works both ways, and the birds certainly benefit by this sensible regulation.

My friend had horrid visions of small boys armed with slingshots prowling about her garden and shinning nimbly up the apple tree to rob the nests of frantic bird parents.

I thought of my own tribe of young Indians, racing and shouting from morning till night, yet caring with infinite tenderness for a robin with a trailing wing. I remembered their bitter grief the day they brought in a young crow so badly mangled that it seemed best to end its suffering forever—a grief that even the subsequent elaborate funeral, attended by the entire family, could not wholly assuage.

I thought of their breathless excitement last winter when the cardinal came for the first time to the feeding box in the dining-room window; and the hours on end that these riotous lads sit quiet as statues watching the visitors at this popular restaurant.

We have kept a list every winter of the different kinds of birds that come to our lunch counter, together with the date on which they first appeared. How often has Sammy dashed upstairs shouting, "Mother, come quick, the kinglets are here again," or Bob rushed in to announce a newcomer, whereupon they all fall upon the bird book, and, having satisfied themselves as to his identity, add his name to the list with utmost pride.

Sometimes a bird is difficult to place, and one frequent visitor was called simply "small brown and white sparrowy bird, unidentified" until her third winter with us, when Bob triumphantly announced that she was Mrs. Purple Finch, and proved it, not only by the book, but by the fact that shortly afterward she came to dinner escorted by two of the lovely rose-colored gentlemen of her family.

During the bitterly cold February of 1934 a brown thrasher came to our window. All the books told us that it couldn't happen; that we must not expect him until late in April. Yet there he was—a brown thrasher—there was no mistaking that glittering yellow eye or the wren-like flirt of his tail. There he was, and there he stayed through the short hours of the afternoon, while chickadees and titmice flitted back and forth, and jays and nuthatches scolded in the hemlocks nearby.

How we wished we could bring him in and warm him by our fire. All afternoon the children hovered near the window in almost tearful anxiety. At dusk he flew away, out into the snow and biting winter winds, whether to perish or to find safe haven we never knew.

Every spring I offer a prize to the child who shall see the greatest variety of birds during the summer months.

The result is that they are able to recognize a great number of birds, that their ears are attuned to the faintest bird note, and their eyes quick to discover the singer in the leafy branches.

Though three-year-old Tommy announces that he has seen a stork, a parrot and a blue eagle, and that he knows where there is a morning-glory's nest, he is learning, nevertheless, to have a real interest in birds, and would no more disturb a nesting robin or steal an egg than would his older brothers and sister.

Each child has his special task to perform. Tom is quite able to fill the bird bath and drive away prowling cats. Mary keeps the feeding boxes filled with seed and suet. Bob and Sammy make and care for the bird houses. These are built with thoughtful care for the needs of future occupants, and the boys know just where to hang them, taking them down to be scoured in late autumn and putting them up again before the first feathered tenants arrive in March.

Of course they are interested in birds' eggs, and, since boys would not be boys without a "collection", they have theirs, too; but it consists of bits of blue or speckled eggs found on the lawn and mounted with painstaking care on a card, to be duly labeled: "Found under robin's nest", or "We think this is a hatched thrush's egg that the mother bird dropped on our lawn."

BACK TO THE NEST

One type of boy returns a fallen bird to the nest; another destroys it with an air-gun. Which matures into the better citizen?

Feathers are collected, too, and are the cause of many a lengthy argument, the bright reds, yellows and blues being worth several of the drabber varieties, so that some sharp trading goes on between the neighborhood youngsters.

The movies and the radio have peopled the world of our children's imaginations with cowboys, G men and gangsters, so that our homes are fairly bristling with toy weapons. Open any youngster's private cubby-hole and you will probably find what approximates an arsenal.

Yet it is pleasant to know that our young desperadoes and master minds have not yet lost the capacity to be tremendously thrilled by simple things. The night I let my four sit up until the unheard of hour of ten o'clock, so that I might take them to a lonely spot to hear the eerie call of the whippoorwills, will, I am sure, be a bright spot in their memories long after childhood has gone. Nor, I think, will they soon forget the night I awakened them, and let them sit, wide-eyed and awed, on the window sill to listen to the unearthly hooting of a pair of owls nearby.

The children have thrilled to see a great blue heron, motionless as a china figure, on the brink of our lily pool. They know the rattle of the kingfisher as he drops into the water and rises with one of our cherished gold fish.

They can tell you that the thrasher and the catbird will nest in the syringa thicket, while the robin and gentle brown wood thrush prefer the lilacs round the door. They are familiar with the lament of the mourning dove, as well as with the cry of the cuckoo, and the songs of the oriole and tanager. They have opened the door on a frosty morning to find a cock pheasant and his wives eating the barberries from the hedge and complaining softly about this meager fare.

All of this lore they are eager to impart to their teacher, their friends and, indeed, to anyone who will lend a sympathetic ear. We do not know any boys who go about slaughtering birds or plundering their nests, but we do know a good many who are proud to relate the story of a newly discovered bird neighbor or of the exciting rescue of a feathered family from some threatened disaster; and the boy who has tenderly gathered up a fallen fledgling and carefully put him back into the nest is not likely to kill that baby's parents in order to show his skill with a sling-shot or air rifle. They are our future conservationists.

•

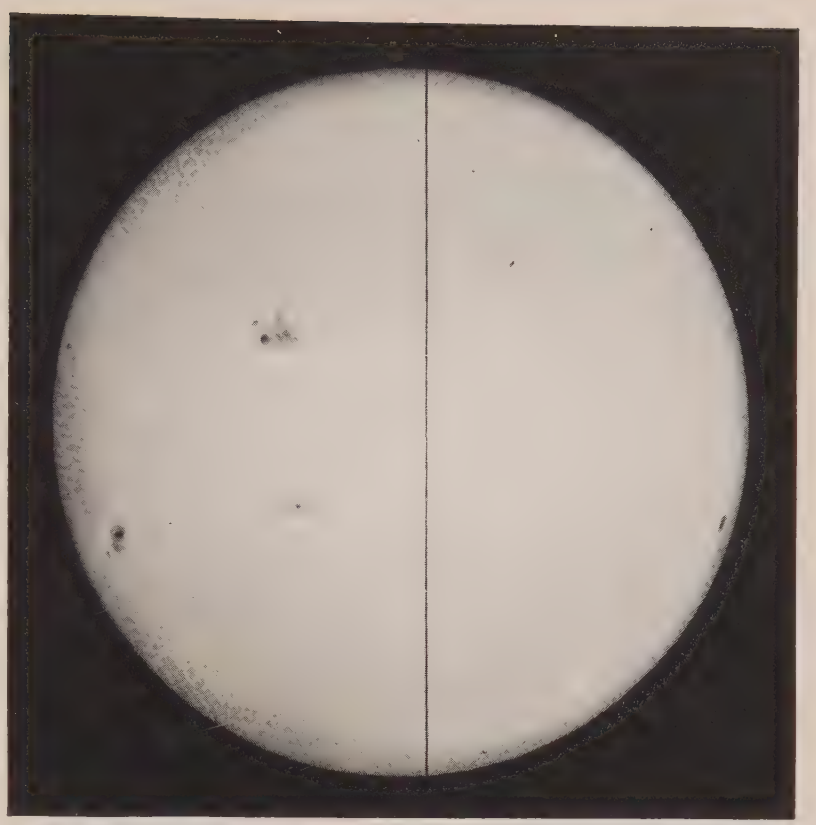
WARNING

By PAUL H. OEHSER

Up, birds! up higher where the sky is kind
And the air is free from the powder's stink;
Linger no longer by the shadowy brink—
I see a hunter going to his blind.
Fly for your lives! Now you must leave behind
These marshland homes of muskrat and of mink,
The fiery eyes that come at night to drink,
The wild rice waving in the autumn wind.
But futile is my warning, for I know
How hunger drives you back to these decoys,
How one by one you drop so helplessly—
I shall be sad, O aged Anatidae,
When you depart, with one last fretted poise,
To join the pigeon and the buffalo.

SUNSPOTS and THE EARTH

By ISABEL M. LEWIS



THE PHOTOHELIOGRAPH REVEALS THE SUNSPOTS

Weather permitting, the Mt. Wilson, Harvard College and U. S. Naval Observatories take daily pictures of the sun, and it is from such records that we have learned how sunspots move in cycles. This photograph was taken by Mrs. L. T. Day at the Naval Observatory on November 27, 1936

WITHIN a year or so the sun will again pass through a sunspot maximum period. Solar activity, which manifests itself not only in outbursts of sunspots but also in an increase in eruptive prominences and the faculae, or bright patches, that are most prevalent when the spottedness is greatest, is now well advanced toward the maximum.

The last sunspot minimum period, when days would pass without the appearance of a single spot on the face of the sun, occurred in the fall of 1933. The average length of the sunspot cycle is about eleven years and the rise to maximum, which is more rapid than the fall from maximum to minimum, usually requires about four and a half years.

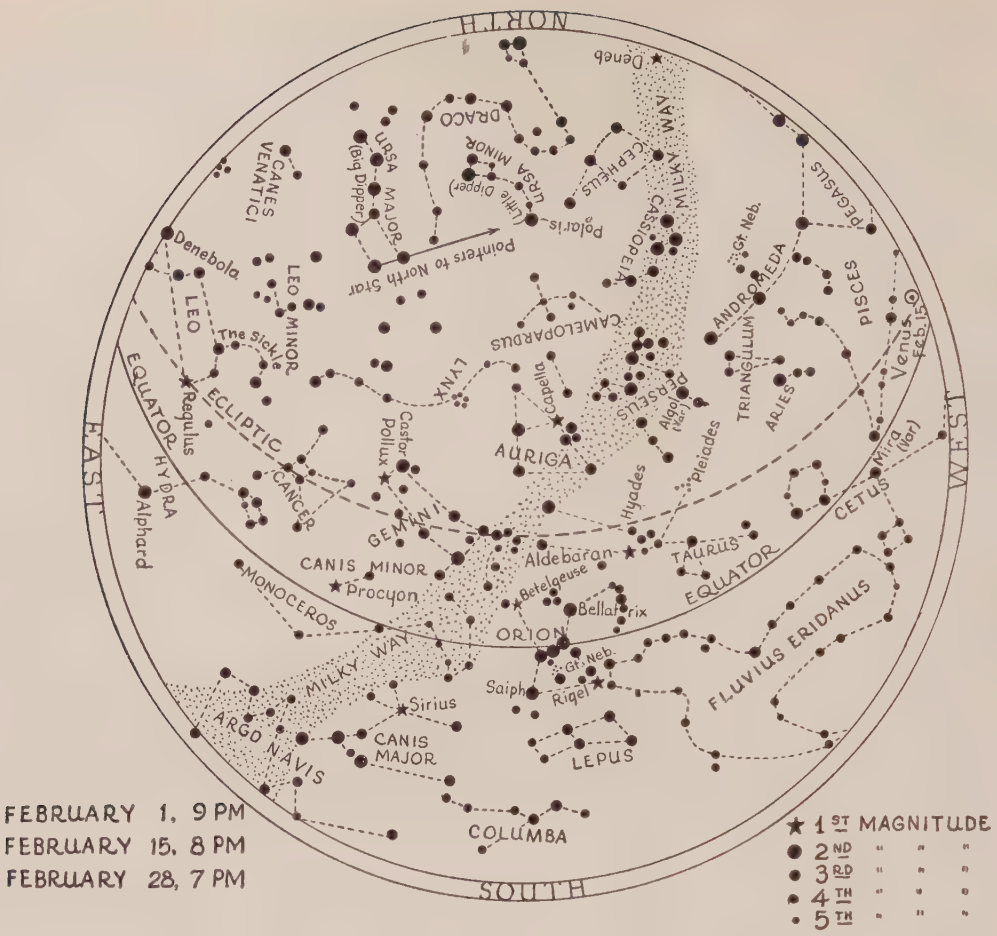
At the sunspot minimum period there are four zones in which sunspots appear. Spots of the old cycle are then dying out in low solar latitudes, at distances of eight or ten degrees on either side of the solar equator, while at the same time spots of the new cycle are beginning to appear occasionally in high solar latitudes, generally between thirty and forty degrees north and south of the equator. As time passes, spots of the old cycle disappear entirely and those of the new cycle gradually work down toward the solar equator. At the time of the sunspot maximum, when the sun is never free of spots, they appear in greatest numbers at a distance of about sixteen degrees north and south of the equator. Then, and for a year or more before and after, the intense solar activity that exists at the sunspot maximum will make itself felt upon the earth in many ways.

Great magnetic storms will occur on the earth, often disrupting telegraphic communications and causing radio fade-outs.

Auroral displays also occur more frequently and are more intense as the sunspot maximum approaches. The surface air temperature of the earth has been found to average about a degree lower at the sunspot maximum than at the minimum. Rainfall and cloudiness, plant and tree growth, and even the number of cyclones are other phenomena that show a more or less close correlation with the sunspot period. The form of the solar corona varies remarkably with the sunspot cycle. The sunspot minimum type of corona has long equatorial streamers and short bushy rays curving sharply to east and west above the solar poles like lines of force from a magnet. The sunspot maximum corona is more brilliant and more evenly developed in all directions and the short polar rays are absent. The intermediate type of corona, such as appeared at the time of total solar eclipse of June 19, 1936, lacks the long equatorial streamers of the minimum type but is less brilliant than the maximum type. The prominences that are usually so conspicuous on the limb of the sun at a sunspot maximum eclipse are usually neither large nor brilliant in the intermediate type though great solar prominences may occur at any time in the sunspot cycle.

Great sunspot groups, such as occur frequently at the maximum, appear occasionally at other times during the sunspot cycle and may be accompanied by magnetic storms, auroral displays and radio fade-outs on the earth.

Sunspots are known to be solar storms of a cyclonic type. The central vortex of the spot is the umbra, the outlying portions, much greater in extent, the penumbra. Magnetic fields exist in all sunspots and the temperature in sunspot regions is between 3,000 and 4,000 degrees Centigrade as compared with a temperature of 6,000 degrees for the normal solar surface. Their darkness is due to this difference in temperature. If the more brilliant solar background were removed, even the dark umbra of a sunspot would shine brightly by its own light. Spots occur more frequently in groups than singly and the preceding and following spots of a pair are usually of opposite magnetic polarity. A single spot has



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

often been seen to divide suddenly into two spots of opposite polarity, the two newly created spots violently flying asunder.

Sunspot groups large enough to be visible to the naked eye are not unusual during the sunspot maximum period. On rare occasions they cover more than a tenth of the sun's diameter. Naked-eye spots must have a diameter greater than 15,000 miles to be visible without a telescope. Though a spot may form and disappear in a single day the average life of a spot is two or three months. It may require days or even weeks for its complete development. For some time before its appearance a disturbance below the surface is evident. Many brilliant faculae, or bright patches appear, among which pores or black dots are scattered. These increase in size and gray patches appear between them like a veil over a dark mass. This veil grows gradually thinner and finally disappears, and in its place rises the spot complete with its umbra and penumbra. It finally disappears as bridges of intensely brilliant light from the surrounding surface cross it or it is completely engulfed by the photosphere. As the sun rotates on its axis in about 25 days at the equator, and 27½ days in latitudes 45 degrees north and south, sunspots take about two weeks to cross the solar disk from east to west, and the same group often returns several times before it completely disappears.

Photographs of the sun are taken daily at the Nav Observatory with a photoheliograph which has a lens five inch aperture and nearly forty feet focal length. Th gives an image of the sun nearly 4½ inches in diamete

Of special interest this month will be the second di appearance of Saturn's rings to take place within a year The last disappearance of the rings occurred on July 1 o last year. On February 20 the earth will cross the plan of the rings from north to south and even in the larges telescopes they will disappear from view for a short period. After that date the southern, or lower side of the rings will be visible for the next fifteen years and will be at their widest opening seven or eight years from now. Saturn is now low in the west at sunset.

Venus is a magnificent evening star and reaches its greatest eastern elongation on Feb. 5 when it will set more than three hours after the sun. Mars is now in Libra and will be in quadrature with the sun on February 4 when it rises at midnight. It is now as bright as a first magnitude star and is increasing steadily in brilliance. Jupiter is coming well into view in the morning sky in Sagittarius. It may be seen low in the southeast before sunrise. Mercury will be at its greatest elongation west of the sun on Feb. 7 and will then be only a few degrees northeast of Jupiter. It should be visible for a few days before and after this date in the morning twilight.

HIKING and CAMPING

By FORUM

Conducted by

ERNEST A DENCH

Hiking and Camping inquiries will be answered by mail if a stamped, addressed envelope is enclosed. Address the Forum editor.

CAMPFIRE LUNCHEON AT TERRACE POND, NEW JERSEY
Hiker Ernest A. Dench serves hot cocoa to the Brooklyn, N. Y., Institute of Arts and Sciences party. Photograph by Robert L. Cox

Choose Camping Companions with Care

Compatibility tests, made on week-end trips, will insure a pleasant vacation next summer

"NEVER AGAIN" moans the camper after a vacation trip blighted by an incompatible companion. Travel alone, and this common experience will never happen, is advice that will be received with deaf ears. The majority of campers crave companionship so badly that they disregard the possible consequences.

The earlier the picking is started, the better your chances of a pleasant fortnight this coming summer. Gradually lead up to the main issue with several week-end camping ventures. These try-outs should reveal the best—or the worst—in your fellow men.

Odd as it may seem, one acute case involved bosom pals. Their Sunday trail trips were harmonious enough, but it was not until their first *continuous* week together in the wilds last summer that friction developed. Jack was the born leader, while Dick was the non-aggressive "I'll-follow-you" type. Jack devised a week's commissary, in which meats dominated. Dick, who consumed lots of vegetables at home, sulked when they infrequently appeared on the camp menu. They were in a sector where it was possible to make a detour of a few miles to a settlement about every other day. Dick yearned to sample the village cooking, pick up some ice cream and do a little sight-seeing. Jack was adamant about staying on the trail and finishing up the food he had so painstakingly rationed. Too late Jack learned that Dick liked his wilderness in small doses. Jack should have conferred beforehand with Dick in this way: "Here are my plans, Dick. Do they suit you? If not, we can change them. Once on the trail we will have to stick to the schedule decided upon."

Who has not, at some time or another, been at odds with the wilderness quitter? He wants everything nice and easy. A porcupine invades the camp at night and starts to gnaw on his boots. The quitter is more scared than annoyed. The cabin roof leaks right over his head on a stormy night, and he kicks rather than change his bed around. They have forgotten the cheese—and he simply must have this dairy product melted in his dish of macaroni. Just as he is becoming accustomed to the daily routine in a fixed camp, they decide to move elsewhere—and a steep pass through the range must be made on foot with heavy packs. "Now," he growls, "we should have had some pack horses on this trip." At least once daily the quitter threatens to return to civilization. He is told to go right ahead—an invitation he ignores. In a large group this fellow can be a diversion; but he is a fiendish liability if he is your one and only partner.

Then there is the physical action type who frets and fumes because severe weather keeps him confined to his tent for several uninterrupted days. The leader is firmly opposed to taking unnecessary risks in such difficult terrain. He who wants to move on is a husky fellow, lacking mental resources to tide him over the inactive period. His friends occupy themselves reading, writing and playing cards.

Campers who have long since passed on to the land where good campers are supposed to go were spared that relatively new human pest—the self-appointed diet specialist.

COOKING IN THE SNOW

Hot coffee never tastes better than it does out in the woods when there's a zip in the air. Photograph by Frederick P. Heitkamp, Jr.

A series of well-balanced meals is one thing, but when the commissary chief is obliged to make radical changes in the menus to appease our faddist—well, it's fortunate if the commissary chief does not suffer from high blood pressure.

When in doubt in the selection of a suitable partner, take two. One will counteract the other, if one proves a dud. You will, in addition, have relief, lessening the risk of being bored, or boring others. A significant decision Admiral Byrd made the winter he isolated himself in a lonely Antarctic outpost was to reject the offer of a *single* companion. He knew there might be murder in their hearts after long association in confined surroundings. The Admiral agreed that three men might have still been friends, but there was no room in the snow hut for a third man.

Your position is reversed when you are invited to join a camping party organized by someone else. The leader's enthusiasm may blind you to the realities ahead. He may, in the city, impress you as a mighty nice fellow, but that's no criterion as to how he will function as your camping party leader.

For all you know he may be very casual in the matter of miles. Some leaders are. We know one guide who announced a nine-mile hike to Conklin's Gap. A newcomer took him at his word, and his feet knew, poor fellow, that he had done eighteen miles at the journey's end. Unfortunately the leader had overlooked providing automobile transportation for the nine miles back to camp.

How we all detest the slave-driver type of leader. Yesterday we had a strenuous day on the trail in order to make this beautiful lakeside camp. While consuming a hearty breakfast, we visualize a delightful day of water sports. The leader cuts our romancing short by brutally announcing we will have to be on our way again by noon. Our feeble protests are in vain, for his mind is made up. We then and there reflect that, next summer, we will sign up with a leader who is considerate enough to alternate the hard and easy days.

A few shades worse than the always-on-the-go leader is the martinet. One very hard-boiled case we recall was that of intentionally camping out in "brushy" woods during a heavy thunderstorm. Yet there was a comfortable lean-to but half a mile distant. The leader was determined that the greenhorn in the party should have his experience, even if everybody else had to suffer! The chap was a wretched spectacle at dawn, as he stood up draped in a ground cloth and two sodden blankets.

Any leader who precedes a vacation invitation with a few week-end trips is sizing you up—and it is your privilege to do likewise.

* * *

These asterisks denote a lapse of time. Your vacation period is near, and that long but thorough search for a congenial camping pal has failed to bear fruit.

You are going to travel alone unless a good substitute plan turns up. Choose a well-traveled locale where you are fairly certain to meet fellow campers. Some may be proceeding in the opposite direction, but a cheery greeting or a short chat will be a pleasant break in the day for you. Other pick-ups you may make at the campsite, where you will perhaps linger for a meal or an overnight together. Your comings and goings with those you meet can be shortened or extended, as mutual preferences determine.

You can overlook a lot of shortcomings in a partner if he has a sense of humor. It's the most precious gift to have when things go wrong, as they are bound to at some stage of a vacation trip. His close cousin in congeniality is the chap who says very little, for a chatterbox can prove very wearying day after day.

Is Your Cabin Snowproof?

A cabin may be rainproof yet let in the snow. The Potomac Appalachian Trail Club had this trouble with the Range View Shelter in the Shenandoah National Park until Otis H. Gates, their chief fix-it man, made a personal investigation.

The Forum quotes from Gates' report in the expectation that other cabin owners will profit from it: "A leaking roof after snowfalls is to be expected with hand-riven shingles, or 'shakes.' The trouble is the overlapping hand-riven slabs do not lie flush and tight with those underneath in all cases, as do milled shingles.

"When snow is accompanied by a high wind, the snow is whipped by the wind into impalpable fine particles and driven laterally into the spaces between the weather shingles or shakes, whence, on thawing, the moisture drips into the cabin.

"We are going over the roof and tack down the shakes wherever it appears the snow would be likely to enter. This should reduce the number and size of the leaks. The only alternative to an absolutely weatherproof roof is an entirely new one of milled shingles."

Cooked Cereals and Cold Air

Thanks to the Forum's series of winter camp cookery experimental trips in the northwestern New Jersey highlands, the participants are learning the general characteristics of cooked cereals.

First, last and all the time, the water must come to a boil before the cereal is added. And that is the chief trouble on a chilly winter's morning, when campers expect quick service.

As on the first trip, we did the cooking on a little portable kerosene stove. The covered pot contained a good three quarts of water. The campsite was in a glen of majestic hemlocks, dark and bitter cold. The temperature was lower here than in a sunny location. The stove, which burned at its customary gait after the required priming, had to counteract the surrounding cold air. This slowed down the boiling, and every time we lifted the lid to investigate, some more cold air was admitted. One hour and five minutes elapsed before the boiling stage was reached.

Our mistake with cereals to date has been to boil too much water in the one pot. We could have halved the boiling time by making the cereal for 14 persons on the two available stoves. In a stationary camp it would be possible to cook the cereal the night before, and heat it up in the morning.

Campfire Breakfast Experiment No. 2

The fourteen in the Forum camping party industriously worked while waiting for the cereal water to boil. Three carefully graded piles of dead wood were ready when the Forum editor started the two cook fires, and put pots of water on to boil for coffee and tea.

Now for the menu and its preparation.

Orange Juice

This was a pure Valencia type, a 12 fluid oz. can of which holds the juice of 12 average size fruit. We eked out the two cans (all we had, and none nearer than California) among the 14, who, if they had their rightful share, imbibed the best part of two oranges in liquid form. It tasted exactly like the juice of a good, fresh orange. This product is endorsed by the American Medical Association.

Cooked Cereal

A blend of wheat, barley, malt and flax in assimilable form. It was palatably cooked

(Continued on page 124)

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Garden Week

The General Federation of Women's Clubs, through Mrs. Arthur C. Flory, chairman of the Committee on Gardens, announces that April 18-24, 1937, has been designated as Garden Week and that the committee will award a $10.00 prize for the best play with a garden theme or setting.

Each contestant may submit but one play to the State Garden Chairman (if none, to the State Chairman of the Department of American Home). Only unpublished plays and those not lasting more than fifteen minutes, may be submitted. In submitting manuscripts, make sure your name does not appear on it. It should be enclosed in a separate envelope which in turn is placed in another envelope bearing the author's name, address and club affiliation only.

State chairmen are delegated to select their state entry and forward their choice by April first to Mrs. E. G. C. Williams, Danville, Ill., chairman of gardens for that state, and chairman of the contest, or to Mrs. Arthur C. Flory, General Federation of Women's Clubs, Washington, D. C. Mrs. Williams will choose two or more judges whose names will be announced. The contest closes March 15.

Gardens Indoors

Allen H. Wood, Jr., known to readers of NATURE MAGAZINE for several contributions in the past, is the author of a new garden book entitled *Grow Them Indoors*. He kindly inscribes it to us on the fly-leaf, and if the brief lives of our potted plants are any criterion—which they are—we sorely need the book. Not only does Mr. Wood go into the general care of the more common house plants, but he introduces the reader to a number of fascinating indoor plants not generally found in the average home. Thus his book is not only valuable for its advice but as a suggestion for horticultural adventure. A Boston business man, Mr. Wood has made plants a consuming avocation and he combines intimate knowledge with the ability to write interestingly. The book is published by Hale, Cushman and Flint, Boston, and sells for only $1.75.

R. W. W.

How Are Your Radishes?

Most of the popular garden books are devoted to flowers, the province of the lowly onion, radish and their relatives, close and distant, being left to the agricultural college leaflets. Now comes *The Vegetable Gardener's How Book* by Chesla C. Sherlock. We'll confess we have never had any interest in vegetable gardening since, at an early age, we tenderly nurtured and raised to maturity a solitary parsnip. This we harvested and bore proudly to our mother that it might be translated into the chief event of the evening meal. The result was our earliest disillusionment, the scar of which is still deep within us. If anything would restore our faith, however, it would be Mr. Sherlock's book which conducts us from the general vegetable garden to the salad garden, and, thence, to the fruit garden. If you can't raise vegetables with his help, you'd best go back to coreopsis. They never fail. The Macmillan Company has published this boon to the vegetable gardener and asks a modest three dollars for the volume. R. W. W.

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UNSOLICITED ENDORSEMENTS

We receive hundreds of unsolicited letters of endorsement, many of these letters coming from persons of prominence and position. Extracts from some of the letters received are as follows: Mr. W. F. White, 2939 73rd St., Kenosha, Wis., writes: *"I find your Sprayer the most efficient device for gardens. I would not be without it. I have used several kinds but find your Sprayer a great time and annoyance saver."* Miss Isabel Ross, 330 N. Catharine St., LaGrange, Ill. states in her letter: *"I am very much pleased with the Sprayer. It saves hours of time."* Mr. R. C. Brown, secretary of Meridian Rose Society, Meridian, Miss. writes: *"I am delighted with the Sprayer and cartridges, as far as I am concerned if I could not get another one of these Sprayers the one I have could not be bought for ten times the price I paid for it."*

Mrs. Carl Jordan, 2823 Floral Blvd., Butte, Montana, states: *"I have found your Spraying outfit all that you claimed for it. It is by far the most satisfactory spraying device I have ever used."*

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Nature Magazine in School

A Department of Aid to the Teacher

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science
Washington, D. C., Schools

The Philosopher

Most children are naturally fond of dogs and this splendid article could be read and enjoyed by pupils in all grades above the fourth. Many of them who own dogs would do spontaneous composition work if they were writing about these pets as if the animals themselves were doing the talking. As one little girl said, when writing about her German shepherd, "I smell a ground-hog, I dig in the soft, sticky mud, the smell gets stronger, faster and faster the earth flies and harder and harder I push my nose into the ground but the ground-hog is too deep. I leave and return to the house where breakfast will be served."

Crystal Tears of the Blue Ridge

The beautiful legend concerning the formation of these crystals might well be told in connection with the scientific story of their origin. Experiments pave the way for an understanding of how crystals form and should precede the reading of this article. Crystals may be made in the classroom by suspending a string in a solution of salt and water. Pupils should discover for themselves that the resulting crystals have the form of cubes. This shape comes from the action of forces within the salt that cause it to be arranged along three directions each at right angles to the other, crosswise, lengthwise and up and down. In the case of the fairy crosses, the material of which they are composed is also arranged at right angles, but the force of the attraction along each of the axes is different.

Quartz, calcium and mica crystals are quite common and serve to exemplify the diversity of form assumed by crystals of different substances. As specimens are brought in pupils should notice the number of sides and the direction of the faces of the crystals. As a basis for understanding one of the causes for the difference in size of crystals of the same substance sugar crystals may be made by heating sugar and water in separate containers, allowing one to cool very rapidly by beating it, and allowing the other to cool very slowly by keeping it in the warming oven for some time before exposing it to room temperature. The latter, where the crystals had time to form, will have the larger crystals. On some grade level the study of crystals should be included in the units dealing with the earth.

Noses

This article presents worthwhile arrangement of material. After pupils have had some experience with individual animals so that they have an idea of the significance of noses, feet, ears, eyes, and other features, it is a valuable experience for them to compare the uses and adaptations of these forms in different animals, making drawings and keeping notes to show the wide variation. Whenever it is possible to take a class to a zoological park, these studies should be made by actual observation as well as reference reading. This article, and the *Story of Animals* published by the Follett Publishing Company, are excellent references. Among pupils with more mature minds, we might suggest that not all bodily formations are now of use, and others are of limited usefulness. It is possible that through the process of evolution some animals and plants have lost the power to produce the best adaptation along certain lines. For instance, the elephant has progressed along lines that limited his development in certain directions. His great size and heavy head would have made a long neck impossible, since muscles strong enough to lift such a head at the end of a long neck were out of the question. In consequence, as he gradually became larger and larger, his snout became longer and longer in order to reach the ground. At the present time the adaptation of this snout is indeed remarkable.

Tree Snails of South Florida

Before the wonderful natural heritage of the Everglades is lost forever, could not a great section be set aside as a Nature preserve where not only the tree snails but other interesting forms of plant and animal life could be saved for future generations to enjoy? Perhaps if enough people in all sections of our country directed their influence upon the group responsible for the establishment of such areas, this would become a reality. Through their own efforts, their influence upon their pupils and the communities that they serve, teachers can do much to bring about the development of Nature preserves.

The plight of the tree snail of South Florida could be brought in incidentally and yet quite effectively after a study had been made of the particular land snail native to the locality in which the instruction were being given. The *Handbook of Nature Study* by Anna B. Comstock is an excellent reference. Snails have interesting adaptations such as the stalked eye, which can be stretched out inquiringly or withdrawn out of harm's way. The protective use of the shell may be demonstrated by picking up a snail and watching it withdraw its head and body within the shell and close the opening. However, if one remains quiet and allows the snail to rest upside down in the hand, after a time it will slowly emerge and look about. By feeding a bit of fruit one can see how the process of eating is carried on. The manner in which this creature moves about is quite remarkable, as it has only one foot. The slimy path is very characteristic. One great scientist recommends to humans that they study the life history of the snail and like it, "go slowly, go surely and leave a shining trail".

The Australian Bush by Day and Night

Could the marksmanship of the camera be substituted for that of the gun? It could be, if teachers made up their minds to do it. Photographic clubs, exhibits of Nature photography and constant encouragement of all participants would in time make this hobby so engrossing that the gun would have no place. This article offers many suggestions that an ingenious pupil might carry out.

Boys and Birds and Friends

What an ideal home the fortunate children of this author have! From it good citizens as well as real conservationists will come. Studies in character education reveal that there is a very decided relationship between a child's association with living things dependent upon his care and his subsequent personality as an adult. Luther Burbank is quoted as saying that in investigating the histories of criminals in California, he found only one had ever owned a pet or had a bit of ground in which to garden. Through caring for pets, wild creatures or gardens, kindness and sympathy develop. Through the pride of ownership of these, there develops a sense of responsibility that in time includes the community and the nation.

Sunspots and the Earth

Little is known as yet about the relationship between sunspots and weather conditions on the earth. However, pupils can be told that studies are being undertaken to try to establish this relationship, and that in years to come the weather predictions in the almanac may be more accurate.

Large figures have little meaning to children, but they may gain some idea of the importance of the sun to the life on the earth if they try to trace some of the objects in the school room to their ultimate source. For instance, the iron in the furniture is thought to have come from the sun when the earth was formed; wood owes its existence to the sun since light makes the growth of plants possible. Without the sun no animal would have food, because all of them eat either plants or other animals that eat plants. The changing position of the sun in relation to the earth resulting in the change of seasons may be demonstrated with a globe and flashlight. Diagrams can be drawn showing the relation of the sun to the water cycle. Pupils can watch the action of weathering upon rock changing it to soil, and realize that without the action of water controlled by the sun, the soil could never have formed on the earth.

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Everything On Evergreens

A complete guide to the evergreens, written in non-technical language, has just been published by the D. Hill Nursery Company of Dundee, Illinois. Entitled *Hill's Book of Evergreens,* this book by L. L. Kumlien ranges from a presentation of the geological background of conifers to the methods of caring for your front-yard ornamental tree. Twenty years of experience in answering questions on evergreens has guided the author in assembling the information contained in the book, which comprises 300 pages and contains 360 illustrations, forty-five of which are in natural colors. Nurserymen, florists, landscape architects, instructors and homeowners will find this handbook a valuable addition to their library. Grouped under four main sections, evergreens are discussed first in their relation to geology, folklore, history and poetry. This is followed by sections on seed collecting, propagation, culture diseases; foundation planting, outdoor living rooms, hedges and other uses, and a description of varieties. So great an amount of material has been gotten into this one volume that the index alone requires the last dozen pages of the book, which is available from the publishers for $3.50.

Old-Fashioned Garden Flowers

Old-Fashioned Garden Flowers, by Donald Culross Peattie, bulletin number 19 of the Field Museum of Natural History, contains photographs and descriptions of many of the favorite flowers our grandmothers grew in their gardens, and which deserve to be better known today. They include honesty, dittany or gas plant, bleeding heart, the clove pink, London pride, four o'clock, tansy, sweet william, and many others. This booklet can be obtained from the Museum for 25 cents and should serve as an incentive to grow some of these "forgotten" garden beauties.

Trap Contest

The tenth annual humane trap contest, with prizes amounting to five hundred dollars, has been announced by the American Humane Association of Albany, New York. For the best two traps for taking animals alive and unhurt, $150 and $75 are offered. Prizes in the second group are $100 and $50 for traps that hold without injury, and in the third group two prizes of $85 and $40 are offered for traps that kill humanely.

The purpose of this contest is to encourage the development and production of traps that will be as efficient as the old steel leg-gripper and yet eliminate the injury and suffering caused by this type. Write the American Humane Association for full particulars. Everyone is eligible. Judges who served in the last contest are Edward A. Preble, Ned Dearborn and J. J. Slautterback.

Book of Minnows

Besides being a handbook on *Minnows of Michigan,* bulletin number eight of the Cranbrook Institute of Science series contains material on the entire group—the family Cyprinidae. The publication, prepared by Carl L. Hubbs and Gerald P. Cooper, is available from the Institute, Bloomfield Hills, Michigan, for 50 cents, currency or stamps. It is excellently illustrated with photographs and drawings.

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Hiking and Camping Forum

(Continued from page 120)

in the time—20 minutes—quoted on the carton. It does not require patient chewing as some cereals do. We served it with milk and sugar. Approximately half of the 1½ lb. package remained after 14 portions were removed.

Alas, in our anxiety to prevent the bitter cold outside air from lowering the temperature of the boiling water, we forgot to follow the "pour cereal into water *slowly*" directions on the package. Our quick action in discharging three cupfuls of cereal into the pot produced a slight lumpiness. The lumps did not average more than two per serving, among the 14, and it was a simple matter to remove these with a spoon.

Tea with Lemon

Most of the Forum campers prefer their tea with lemon rather than milk. We substituted a can of pure lemon juice, packed orchard fresh—and we are inclined to believe the label, as we could not detect the difference between the canned and the fresh juice. Two tablespoonfuls from this 8 fluid oz. can are equal to the juice of one lemon.

New Kind of Coffee

An eastern grocery chain has acquired exclusive rights to a flaked coffee, packed in 1 lb. Cellophane bags. Advantages over ordinary coffee are supposed to be more cups to the pound and quicker to make. Preparing this coffee by one of the regulation outdoor methods, it proved no different from any *good coffee well brewed.* Our method was to bring water to a boil in a separate pot, and then pour it in a dry pot, first with the coffee flakes inserted, then ten minutes of steeping on the hot stones.

Drizzled Honey on Toast

Six slices of bread were toasted at a time on a large hand grill. We used drizzled honey instead of butter. Honey is too rich to serve as it pours from the jar or can. The stunt is to insert the container in warm water for about ten minutes. It then has the right consistency—tiny threads instead of a heavy stream.

Further particulars of the branded foods served on this experimental breakfast are included in the *February Gadget List,* available for a self-addressed stamped envelope from the Forum editor. When writing for this list, please advise whether you wish these campfire breakfast menus to continue. That way we can tell whether they are performing a useful service or not.

February Gadget List

1. On bad weather trips since last June the Forum editor has worn a lightweight oiled silk rain jacket. His candid report on this garment is now ready.

2. A famous western woolen mill offers a varied range of solid colors, fancy plaids and checks in woolen shirts. Forum editor likes the smart appearance of the one he wears, and finds it both warm and water repellent.

3. The winter sports catalog of an eastern outfitting house may, in mid-season, suggest some item you cannot procure locally.

4. A new rack attached to the roof of a closed auto will, it is contended, safely hold as many as five pairs of skis.

5. A combined carrying bag and back rest which has nothing to adjust. When closed it can be used to carry picnic supplies. When opened it becomes your seat on the snow or grass. Made of gayly hued canvas.

6. The camper who desires to plan well-balanced meals with a reasonable degree of certainty, now has a friend in a cardboard disc device. It operates quickly and accurately on a scientific principle. With it comes a condensed book of balanced menus.

Have you sent your 20 cents to save you the trouble and postage of writing in each month for these gadget lists? This service covers a full year. However, if you need only the *February Gadget List,* a stamped self-addressed envelope will secure it.

YOU KNOW THE ANSWER

Recently the following letter was sent to officers of hiking clubs throughout the United States. Our future course must depend upon the response to this letter of inquiry. We therefore reprint it here to give all followers of Mr. Dench's Forum, or any other readers, an opportunity to express themselves. The letter read:

"When the American Nature Association, more than two years ago, decided to devote valuable space in Nature Magazine to the Hiking and Camping Forum it was in the conviction that it was performing a needed service. Our Association was organized for constructive effort, not for profit. This effort should and will be exerted in directions where support of its educational and conservation ideals is evident.

"During the past two years the director of our Hiking Forum, Ernest A. Dench, has pioneered. He has worked and given service out of proportion to the modest honorarium received for his service. Yet a recent editorial survey made by the Association found the interest in the Forum rated second from last in the general editorial grouping of Nature Magazine. The juvenile department was last, and has since been discontinued.

"Organized hikers throughout the country have been offered an opportunity to become acquainted with the Forum and to support the work of the American Nature Association through a small introductory membership fee. The traceable response has been very small. The question logically arises—Are we justified in devoting the space to the organized hiker? Are we warranted in continuing to extend varied services to him? As a hiking club official, you can give us the answer.

"First, we want your frank opinion about the Forum. Second, we believe that the American Nature Association, if the Forum is to continue, is entitled to tangible support. The opportunity to give this support lies in the offer of introductory Hiking memberships of five months for one dollar; or in obtaining five or more memberships among your club members at a special one-year membership rate of two dollars a member.

"If we are wasting money and time, and devoting space in Nature Magazine to a service that is not desired we naturally want to know it. If the interest of the hiker is local only; if his interest is only in hiking and making trails and not in Nature at all; if he has no interest in conservation of our Natural Resources, we want to know it. Please tell us. You know the answer."

RICHARD W. WESTWOOD
Secretary, American Nature Association.

●

The Camp Invalid

A page of menus for the camp invalid makes the *Practical Camp Cookery For Guides and Guiders* different from most handbooks of its kind. The person who becomes sick on a mobile camping trip or in a stationary camp, produces a situation which is best faced in a sensible way.

Another helpful chapter stresses the advisability of a separate tent for the storage of foodstuffs. Any systematic arrangement requires that the needed supplies may be gotten at quickly; yet avoidance of such unfitted associate foods as butter and onions. Packing cases of wood or cardboard make very useful cupboards.

This volume is exceptionally good value for one shilling and sixpence. Brown Son and Ferguson, Ltd., Glasgow, Scotland, are the publishers.

DIRECTORY OF NORTH AMERICAN HIKING, MOUNTAINEERING AND TRAIL ORGANIZATIONS

A Foreword

Over a two-and-one-half-year period the Forum editor has acquired a fairly accurate knowledge of the number of organizations in existence.

Every *known* club has been written to at least once, for essential Forum information. Some clubs have secretaries who do not answer correspondence; while certain others are reluctant to give out needed facts and figures.

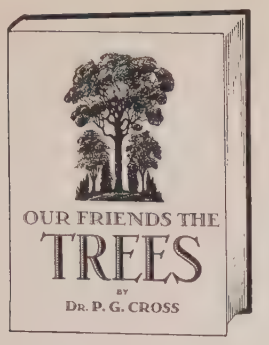
Until this attitude is changed, a comprehensive Directory is impossible, apart from the all-important production costs involved.

In a talk on club publicity at the last annual meeting of the New England Trail Conference, the Forum editor did not soft pedal the issue: "The enemy or chief objector within the club fold is the fellow who considers that a trail exists for the exclusive use of a chosen few. No others have a right to intrude.

"In some clubs this type of member exercises considerable influence on administrative policies. That is why, with a few noteworthy exceptions, Organized Hiking operates on a 'You Try to Find Us' platform. In some big cities it is difficult for a desirable person with hiking inclinations to contact an equally desirable club. Many libraries and publications are stumped when consulted on hiking clubs. Typical of this is one large eastern city, 'fed' by a small army of clubs; yet the main public library has only one local club schedule on file. There are plenty of bulletins from inland and western clubs, however.

"A more liberal viewpoint among these club individualists would tend to interest

(Continued on page 126)



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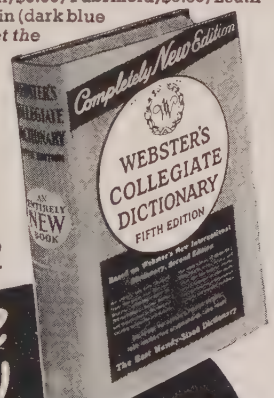

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Amateur Archaeology

The Colorado Museum of Natural History at Denver is preparing a series of mimeographed papers on various Nature subjects, the first of which, *The Amateur Archaeologist,* has been written by H. M. Wormington. A real amateur is not one who lacks skill in the pursuit of his hobby but one who is a seeker of truths in a field from which he receives no remuneration. The purpose of this paper is to aid the sincere student of archaeology to become a constructive rather than a destructive force and to enable him to derive the fullest amount of satisfaction and pleasure from his avocation. The author expresses the hope that the article that makes up Bulletin No. 1 will not only aid the amateur but will make it possible for him to meet the professional not as an enemy, as is sometimes unfortunately the case, but as a friend and collaborator striving toward a common goal. The price of the Bulletin is ten cents.

Grand Canyon Bulletins

Prehistoric Man in the Southwest, a recent publication of the Grand Canyon Natural History Association, is the story of prehistoric man as he is believed to have appeared in the American Southwest, and of his ancestors in other parts of the world. Special attention is given to the evidences of prehistoric man living in and near the Grand Canyon. The illustrations represent charts, models and specimens in the Wayside Museum of Archaeology. The price of the Bulletin is 25 cents.

Another publication, a seventy-five page booklet, makes available for interested persons a convenient means of ascertaining what plants occur in the Grand Canyon region and establishes a standard of authentic plant names in this region for use in educational and research work in the National Park. This check-list is available for 50 cents from the Association at Grand Canyon, Arizona. Ask for Bulletin Number 6.

Little Wolf

The Little Wolf, by Wendell and Lucie Chapman, is the story of a coyote from the time he was a cub until he had a family of his own. He is presented as he really is—an animal of interesting personality but with some bad habits. The authors have given us a fascinating life history and are successful in keeping the reader's sympathies with the wily coyote.

The authors long have made studies of wildlife, first only as a hobby when they went into the wilds during the summer and observed the animals around them. Photography followed (this volume is excellently illustrated with close-ups of many different wild creatures) and then came the decision that their major interest was to present material to a public careless of the fact that the wildlife of America was becoming extinct. Their object was to present their material to young people as well as adults, and this desire is now crystallizing into a series of books about American mammals, of which *The Little Wolf* is the first. Their sympathetic but not sentimental presentation of the coyote will increase the growing army of those interested in the conservation of American animal life.

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Hiking and Camping Forum

(Continued from page 124)

more people in the club movement, and open more trails on private property. It takes the right kind of publicity to enlighten property owners on the recreational advantages of trails and trail hiking."

The existence of some of the clubs listed in this directory has been discovered by methods which even Sherlock Holmes would not have scorned. Not being infallible in his detective work, the Forum editor hopes, with the kind assistance of Forum readers, to learn of omissions.

Explaining the Listings

Organizations are listed alphabetically because some are interstate in scope.

The name and address given is usually that of the secretary, or some other responsible official.

Symbols

C: Exclusively a collegiate or high-school organization.
CT: Conducts trips.
TAO: Devoted to trail or shelter administration.
TMO: Confined to trail or shelter construction and maintenance.
SU: Status unknown.

New England States

American Youth Hostels, Inc.—National Directors: Isabel and Monroe Smith, Northfield, Mass. TAO-TMO.

Appalachian Mountain Club—Main club executive secretary, Miss Adelaide Meserve, 5 Joy St., Boston, Mass. CT-TAO-TMO. Local chapter secretaries: **Berkshire,** Miss Ruth I. Bates, 101 Princeton St., Springfield, Mass.; **Connecticut,** Miss Frances W. Carothers, 55 Elizabeth St., Hartford, Conn.; **Merrimack Valley,** Miss Ruth M. Chase, 35 Franklin St., Concord, N. H.; **Narragansett,** Miss Sophie C. Corp, 180 Bowen St., Providence, R. I.; **Worcester,** Miss Edna O. Lundtrom, 803 Grove St., Worcester, Mass.

Appalachian Trail Conference—Miss Harlean James, 901 Union Trust Bldg., Washington, D. C. TAO.

Bates College Outing Club, Lewiston, Me. C-TMO.

Berkshire School Outing Club, Sheffield, Mass. C-TMO.

Bowdoin Outing Club, Brunswick, Me. C.

Central Massachusetts Trail Conference—Mark G. Pierce, 213 Lincoln St., Worcester, Mass. TAO.

Chatham Trails Association—N. M. Nichols, 29 Crescent Rd., Winchester, Mass. TMO.

Chocorua Mountain Club—Carlyle R. Hayes, 1400 Massachusetts Ave., Cambridge, Mass. TMO.

Colby Junior College Outing Club, New London, N. H. C.

Connecticut College Outing Club, New London, Conn. C.

Connecticut Forest and Park Association—Edgar L. Heermance, P. O. Box 1577, New Haven, Conn. TAO-TMO.

Connecticut Valley Trails Conference—Mrs. Ernestine Perry, 60 Sherman St., Springfield, Mass. TAO.

Dartmouth Outing Club—Wm. S. Curtis, P. O. Box 9, Hanover, Mass. C-TMO.

Dublin Riding and Walking Club—Miss Agnes G. Troup, Dublin, N. H. SU.

Eastern States Mountain Club—Arthur M. Fogg, 63 Pleasant Ave., Portland, Me. CT.

Field and Forest Club—Arnold H. Conza, 36 Dwinell St., West Roxbury, Mass. CT.

Green Mountain Club—Main club secretary, Miss Lulu M. Tye, Rutland, Vt. CT-TAO-TMO. Local section secretaries: **Bennington,** Mrs. Marion W. Riemann, North Bennington, Vt.; **Killington,** Mrs. Ruth Adams Fostman, 25 Seabury St., Rutland, Vt.; **Manchester,** Mrs. Clifford B. Graham, Manchester, Vt.; **Middlebury,** Prof. P. C. Voter, Middlebury, Vt.; **Proctor,** Miss Myrtle B. Loomis, Proctor, Vt.; **St. Albans,** Robert T. Moore, 53 Smith St. St. Albans, Vt.; **Worcester,** Miss Pearle E. Clarke, 24 Oread St., Worcester, Mass.

Green Mountain Horse Association—Earle E. Johnson, Rutland, Vt. TAO-TMO.

Harvard Mountaineering Club—Farnsworth Loomis, Dedham, Mass. SU.

Housatonic Trail Club—Miss Anne Tabor, Pawling, N. Y. CT-TMO.

Intercollegiate Outing Club Association—L. D. Hawley, University of Vermont, Burlington, Vt. C-TAO.

Jackson Outing Club, Medford, Mass. C.

Maine Appalachian Trail Club—J. F. Schairer, 2801 Upton St., N. W., Washington, D. C. TMO.

Metawampe Club—John H. Vondell, Amherst, Mass. C (faculty only).

Middlebury Mountain Club, Middlebury, Vt. C.

Mount Holyoke Outing Club, South Hadley, Mass. C.

New England Trail Conference—Chas. W. Whittlesey, P. O. Box 1577, New Haven, Conn. TAO.

New Hampshire Horse Association—Henry B. Alvord, 316 Huntington Ave., Boston, Mass.

North Side Mountain Club—Frank P. Fabens, Salem, Mass. SU.

Outdoor Associates—Clarence F. Graf, 79 Sudbury St., Boston, Mass. CT.

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Pembroke College Outing Club, Providence, R. I. C.

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University of Vermont Outing Club, Burlington, Vt. C.

Wesleyan Outing Club, Wesleyan Station, Middletown, Conn. C.

Williams Outing Club, Williamstown, Mass. C-TMO.

Yale Mountaineering Club, 744 Yale St., New Haven, Conn. SU.

Yale Outing Club, 744 Yale St., New Haven, Conn. C.

(*To be continued*)

Brevities

Twelve Worcester County groups are backing the Central Massachusetts Trail Conference, purpose of which is to lengthen and otherwise improve existing hiking and ski trails. They will be linked with the trail systems of adjoining sectors. . . . The New York State Trails Conference, with Thomas F. Malone as secretary, is about to crystallize the conservation policies of the many large and small hiking and ski clubs in the Empire State. . . . The Georgia Appalachian Trail Club is favorably impressed with the hiking possibilities of Alabama, after climbing its highest point, Cheala Mountain. More trips will follow. . . . The *AYH Knapsack,* new American Youth Hostels quarterly, is a welcome break in the long intervals between annual handbooks. Annual subscription is 50 cents, and Northfield, Mass., is the place to send it. In 1936 the 4700 AYH members made over 9000 overnights in the 76 New England and New York hostels. . . . St. Louis now has a Blind Men's Hiking Club. . . . Modestly dubbed a Potomac Appalachian Trail Club bulletin supplement, *The Appalachian Trail in Pennsylvania* merits the rating of a very informative pamphlet. Myron H. Avery is the author, while Harold G. Conger contributes a map. 10 cents a copy from the PATC at 901 Union Trust Bldg., Washington, D. C. . . . Maine's uncompleted two miles of the Appalachian Trail stretches from Sugarloaf's summit to the north base of Spaulding Mountain. Possible for an experienced woodsman to follow Helen Taylor's rough blazes, but it is forest primeval—blowdowns every step of the way. . . . The illustrated chronicle of the annual Canadian Rockies trip of the Sky Line Trail Hikers appears in the latest issue of *The Sky Line Trail.* . . . Organized walking tours in Great Britain and Continental Europe are inexpensively conducted every season by the Wayfaring Association, 4 Heugh St., Falkirk, Scotland. Paying guests accepted without restrictions. 1937 program will include trips for American walkers planning to take in the Coronation. . . . Sometimes the cure for a club suffering from a diminishing membership is more liberal guest privileges.

Rossitten Bird Sanctuary

One of the world's finest bird preserves has been established at Rossitten, East Prussia, where a narrow tongue of land separates the Kurisches Haff, a fresh-water lake, from the Baltic Sea. The region is a veritable paradise for ornithologists, and special courses are given each year to experts and students from Germany and other parts of Europe. The sixteenth such course, recently concluded, attracted more than 150 enthusiasts who combined theoretical study with long hours of observation of bird life. In the course of three hours more than 150,000 birds were counted. There are about 270 species at this sanctuary, and fifteen new varieties have come to settle in recent years.

National Front Yards

Roadsides, the Front Yard of the Nation, the title of a book by J. M. Bennett, superintendent of parks and forestry of Wayne unty, Michigan. This is the first volume have seen treating in a general and pular way the subject of wise development of the environment of the roads of s country. Americans have slashed highys hither and yon across the country- e, leaving them for the most part as ugly bons on the landscape, with billboards l hideous highway enterprises on their yed and discolored edges. There has been rowing sentiment for the proper grading l planting of the roadsides, and there many successful typical improvements. e have not, however, scratched the surface what needs attention. In his book Mr. nnett discusses trees, shrubs, flowers, natu- ground cover, nurseries, highway direcnal signs, upkeep and other subjects of portance. There is much meat and much ggestion packed in the pages of the vole. It would be helpful to any groups or ncies undertaking roadside improvement. e believe that Mr. Bennett could have engthened his book by chapters on billards and their regulation and on highway siness and its control. There is much to written about those subjects and they both a part of the subject of his book. e author does dismiss billboards as "obtionable because they are a menace to safe ving and because they detract from rather n add to the appearance of the roadsides." e hope that the present edition of his bk will soon be exhausted and that Mr. nnett will be able to add a chapter deoping the above quoted phrase. The pubers are The Stratford Company and the ce is three dollars. R. W. W.

Cormorant Manual

A booklet on the life of the double-crested rmorant in Maine has been prepared by ward L. Mendall of the University of ine. It is entitled *The Home-Life and nomic Status of the Double-Crested Cor- ant* and is the result of three summers' ervation made on the Maine coast, chiefly e colony located at Marblehead Island in Penobscot Bay. This booklet is Number second series, of the *University of Maine dies,* and copies may be obtained from University of Maine Library, Orono.

Rare Antelope

For the first time, the New York Zoolog- l Park has on exhibition a saiga, one of the ngest and rarest of the antelopes. Alugh it formerly had a much wider range, s now confined to the steppes of Western eria and Southeastern Europe. A specin of this species inhabits the National ological Park in Washington, and his picres appear in the current rotogravure tion of Nature Magazine.

Wisconsin's Parks Popular

A total of 1,224,757 people visited Wisnsin's state parks during the past season, ording to C. L. Harrington, state superindent. Actual count by the CCC made it most accurate record of park attendance r obtained in Wisconsin.

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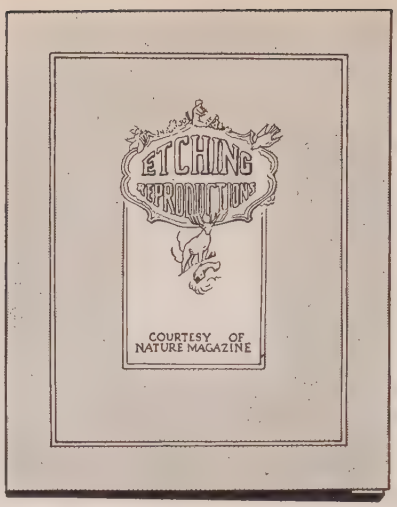

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Photographic Notes

BY SAMUEL BROWN

THE CITY PARK PRESENTS A NEW APPEARANCE IN MARCH, WHEN CHANGING ASPECTS OF FAMILIAR SCENES MAKE FINE SUBJECTS

Lantern Slides

Many years ago the photographic enthusiast had, as a prominent piece of his equipment, a lantern slide projector. Every lecturer illustrated his talks with lantern slides, pictures of foreign countries were shown in public school auditoriums and up-to-date teachers projected graphs and charts as an aid to group teaching. As large cameras and heavy plates were replaced by smaller instruments and film, photographers preferred to make enlargements, exhibiting their pictures in this manner. Large, cumbersome projectors were discarded and used only rarely.

During the past few years the miniature camera has revived the interest in slide projection. The development of small, light projectors, the practicability of small slides and the introduction of color film with which it is possible to make almost perfect color transparencies with the miniature camera are some of the reasons responsible for the new interest.

It is well known that a silver image viewed by transmitted light has a considerably longer scale than the same image viewed by reflected light. For this reason, when a transparency is projected, it is possible to see subtle gradation and detail in shadows that are not otherwise visible. A certain stereoscopic effect which gives one the impression of looking *into,* rather than at, a picture is also obtained by projection.

Almost any negative that will make a good print will also make a good transparency. It is important that there should be good detail in both the highlights and shadows.

THE NEW SEASON MAKES SCENES LIKE THESE TEMPTING BAIT FOR THE WATCHFUL PHOTOGRAPHER

Delicate gradation between tones with sufficient contrast adds to the charm and beauty of a finished positive. Since any defect in the original negative becomes greatly enlarged when the positive is projected, it should be free from blemishes and scratches. Never make a lantern slide from a negative that shows distortion as this is further increased in projection. Lastly, it is important that the negative be sharp.

There are two methods of making lantern slides—by contact or reduction. The first is used where the original is the same size or smaller than the size of the lantern slide. The latter method is used where the original is larger than is desired in the finished transparency. Reduction is practically the same as enlarging. In the latter the distance between the paper and lens is greater than that between the lens and negative. In the former the distance between the lens and negative is greater than that between the lens and paper.

By far the easiest method for lantern slide making is by contact printing. The same procedure as that for regular contact printing is followed. Exposure is critical and the proper time can only be determined by experiment. As a basis for calculation, a negative of average density when printed on an Eastman Slow Plate will be about eight seconds when exposed at six feet from a 25-watt frosted bulb. The same conditions prevailing, when printed on Eastman Regular Lantern Slide Plates will be about five seconds. Thin negatives require about half this exposure while heavy ones may require from two to four times this amount. It is recommended that conditions be kept as constant as is possible in order to standardize the procedure. In this way much waste can be eliminated.

Development, fixing and washing is the same as the regular processing of film. The Eastman D-34 or Nepera developers and the F-5 Acid Hardening Fixing bath are the solutions recommended.

After the slide has been dried, a suitable mask is cut from black paper. This mask is placed in contact with the emulsion side and covered with a thin, clear piece of cover glass. The whole is then bound together with binding tape. The slide is finished by placing a white spot in the lower left hand corner when holding the slide in the hand as it should appear on the screen. This spot serves as a guide to the operator and the slide should be placed into the projector with the spot in the upper right hand corner toward the lamp house.

There are few phases of photography that offer more fascination and permanent satisfaction than a set of slides. Aside from the fact that slide making extends the joys of photography through many dull days and long evenings, it enables the photographer to see his pictures at their best and to extend the same pleasure to a large circle of friends at the same time.

This writer should like to thank the readers of NATURE MAGAZINE for their kind and hearty response to the article on enlarging in the January issue. So many requests have been received for further articles on this phase of photography that we concede to popular demand and will present a further discussion on enlarging in an early issue. We might add here that this department is always happy to hear from its readers. Suggestions and criticisms are particularly welcome.

Films

The past several years have seen advances made in photography that pioneers in the

field only dreamed of. Perhaps the greatest development and undoubtedly the most satisfying to photographic enthusiasts is the introduction of several practical color processes. To the naturalist photographer this is particularly significant. Nature is full of color. The Spring brings the buds, the Summer its brilliant flowers in a riot of color, the Autumn the reds and browns of the leaves and the Winter the color contrasts between the snow and holly and evergreens. Color photography is always appropriate.

The curious and technical minded are led to inquire as to the whys and wherefores of color processes and for those, this department will briefly discuss the three most widely used methods—Dufaycolor, Agfa Color Plates and Kodachrome.

In Dufaycolor film, a matrix of the three additive primary colors—blue, green and red—arranged in a geometrical pattern is applied to the base. Each color of the matrix or screen is applied separately by means of highly specialized machinery. A flat blue-violet coating is first applied to the filter base, and on this are printed—in a greasy ink—a series of extremely fine parallel lines; the base is then run through a bleaching bath which decolorizes the spaces *between* the grease-protected lines. The bleached spaces are then dyed green and the greasy ink removed. This gives alternate green and blue lines on the base and across these, at an angle of 90 degrees, a red series is produced, resulting in "X". After the screen has been applied, a highly color sensitive panchromatic emulsion is coated on top of the color elements, and the coated base is slit and rolled on spools ready for the camera.

In exposing Dufaycolor film the light travels through the screen first and then progresses to the sensitive surface. With each color element acting as a filter, the rays of light pass and affect the emulsion only through those colors of which it alone is composed. For example, red rays of light can pass only the red color elements, blue light only the blue elements, green light the green elements and intermediate rays partially through two or all three elements. White light passes freely through all three.

Upon development the silver affected through each tiny filter is reduced and the transparency is complementary to the original colors of the subject. After development, the film is placed into a bleach bath that dissolves all the developed silver. The third step is to place the film in the developer again in bright light which reduces the silver not affected during the first development. During this process, which is conducted in full light, the transparency in the original colors becomes visible. Fixing and washing complete the process.

The latest developments in Dufaycolor photography are the possibility of making duplicate transparencies, natural color prints, and black and white prints. This extends the possibilities of this fascinating field of photography to a practical basis for amateurs and professionals alike.

For those interested in further information regarding Dufaycolor processes, we suggest an inquiry to Dufaycolor, Inc., 30 Rockefeller Plaza, New York, N. Y.

Trade Hints

The recently revived interest in lantern slides has opened a new field to the amateur photographer. Lantern slide making is easy

(Continued on page 185)

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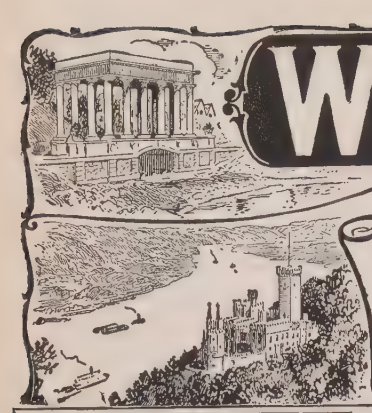

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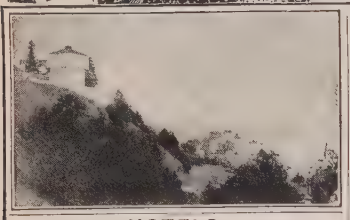

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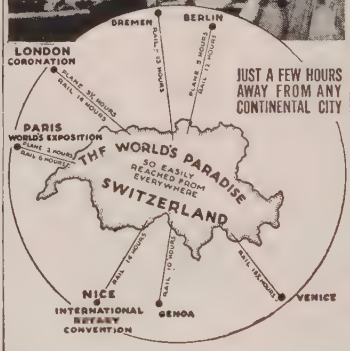

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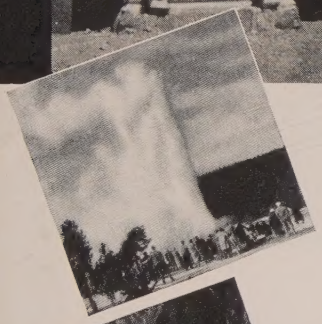

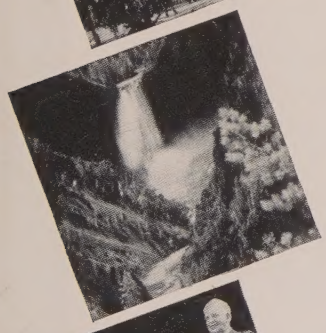

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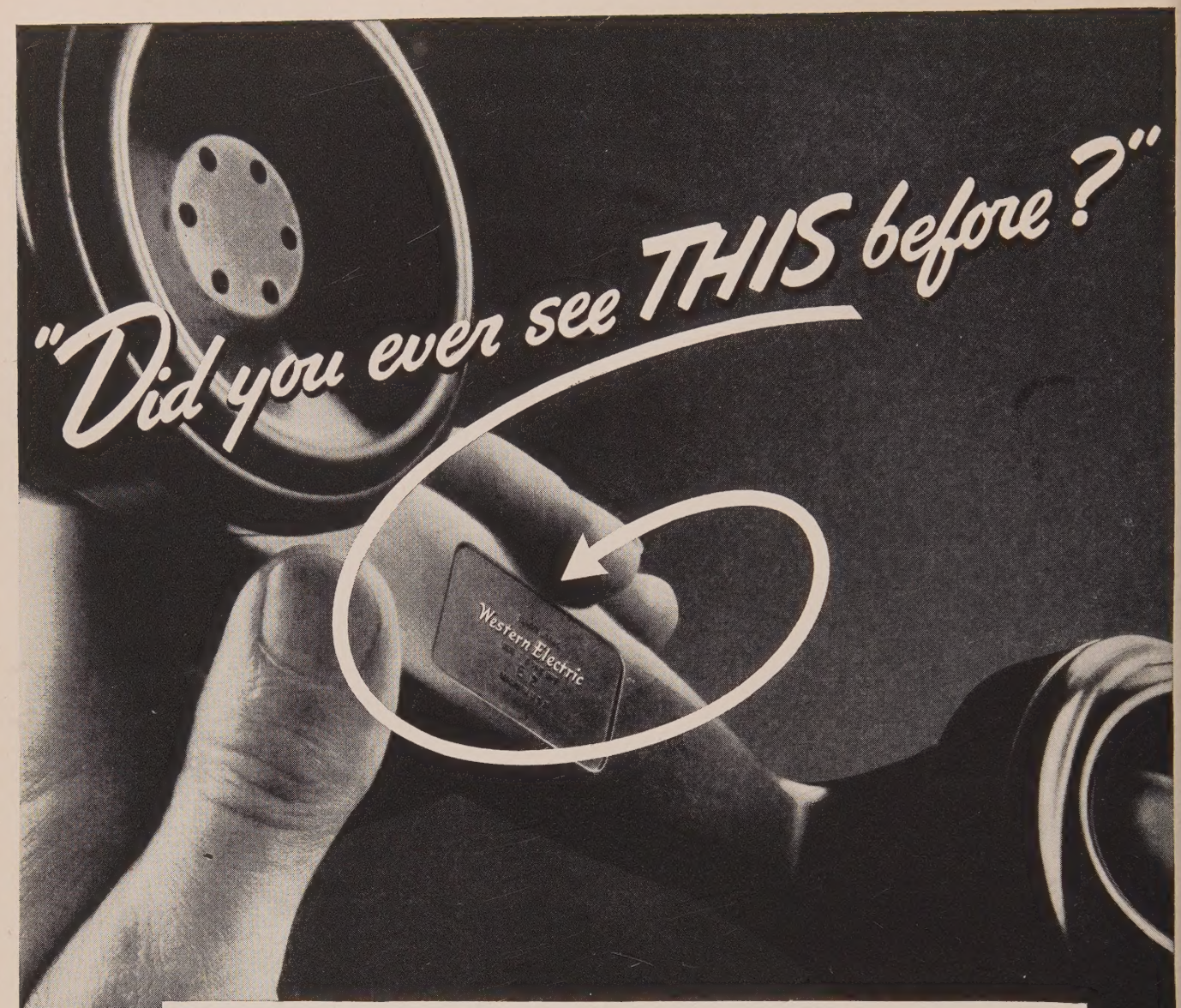

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In March—André Michaux

By HOWARD ZAHNISER

As MARCH came in "like a lion" in 1796, André Michaux was sleeping in a woods in the Cumberland Valley of Tennessee "at a place where reeds or canes were growing in abundance." Snow fell throughout the night, and the next morning his two horses "had their legs swelled in consequence of the cold and of the continually muddy roads" over which Michaux had been traveling. The day's entry in the famous botanist's laconic journal says: "The 1st of March 1796 arrived at Fort Blount on the Cumberland River. Snow continued to fall during a part of the day." So here he remained a day to pull shoots of a new *Sophora* he had discovered. With the ground covered with snow he was unable to get any shoots. Instead, a young officer from the fort cut a few trees, and Michaux "found some good seeds" and pulled roots to replant in his "garden in Carolina."

Only a few nights earlier Michaux had reluctantly slept in the house of an enemy of the French Revolution. The journal entry is a rare morsel: "Although I had not dined I would not accept his supper," wrote Michaux, "believing that a Republican should not be under obligations to a fanatical partisan of Royalty. I was greatly mortified that the night and the rain should compel me to remain in his house. But I slept on my deer skin and paid for the maize he supplied me with to cross the wilderness."

These pictures of the Frenchman digging through snow for roots of a new tree, spurning the hospitality of a political opponent, but accepting as a matter of fact a night in the wilderness woods during a snowfall, are among the attractions of the Journal of André Michaux. Though some of the botanist's notes were lost in a shipwreck and most of them are available only in French, a bountiful portion of them has been Englished and published by the Arthur H. Clark Company of Cleveland, Ohio. Edited by Reuben Gold Thwaites, this part of the journal of Michaux was issued in 1904 in volume III of *Early Western Travels*. There is good browsing in these pages.

There is good reading in the life of Michaux, too. No full-length biography has been written, yet the mere facts of his life as told in introductory and cyclopedia sketches are highly romantic. With ancestors who had long managed the royal park at Versailles, France, he was born at Satory on March 7, 1746. Trained in the family following, he married the daughter of a rich farmer, and then turned to the intensive study of botany as a refuge from despondency when his wife died eleven months later, after the birth of their son, François André. His plant explorations carried him to England, to the Auvergne, and to the Pyrenees. Sent to Persia as a secretary to the French consul, he left his post to wander after seeds and plants in the region between the Tigris and Euphrates Rivers, where some have located that garden in which it is recorded that Adam first gave names to living things.

Back in France again, Michaux was sent to this continent to find trees that could be introduced into France for use in furnishing lumber for naval construction. With his 15-year-old son who was later to carry on his father's work in the exploration and study of the trees of North America, André Michaux arrived in New York on October 1, 1785. First there was the local flora to learn and a nursery to start (near Hackensack, N. J.; abandoned in 1787 in favor of Carolina), but Michaux was soon exploring. For more than ten years he traveled in America—to the Hudson Bay country, to Florida and the Bahamas, in the Appalachians, and across them to the Western settlements, and through the wilderness of the country that is now Illinois, Kentucky, and Tennessee. He collected plants, and seeds, and roots; taught the mountaineers to exploit ginseng; kept a journal of his observations in pioneer settlements; and carried his collections back to his garden ten miles from Charleston, S. C., for later shipment to France. Game birds, too, were among his exports. Political missions for Republican France were added to his concerns later. Yet the plants were always his prime interests, despite discouragements. Half the thousands of young trees sent to France had made a nice gift for the Austrian Emperor. The rest were ill-cared-for, scattered. Michaux' support stopped. Finances exhausted, he returned to Europe in 1796, and though he hoped to be sent again to America, his plans failed and he undertook a part in an Australian expedition from which he never returned, dying in Madagascar, with a tropical fever. Two books, besides his journals, have carried Michaux' name to posterity—*Flora Boreali-Americana* and *Histoire des Chênes de l'Amérique*.

This was the man whose journals written "by the light of his lonely campfires, during brief moments snatched from short hours of repose, in the midst of hardships and often surrounded by dangers" have continued to engage the readers of things quaint and informative of old days —and of the out-of-doors. That March of 1796 that found Michaux sleeping in the snow is a fair sample. In the way that March has, only a few days later there were flowers in bloom for the traveling botanist. At Knoxville, on the eleventh, Michaux was herborising along the Cumberland banks bordered by steep rocks covered with Saxifrage, and on the fourteenth he saw in bloom hepatica, spring beauty, and bloodroot. By the twenty-first he had noted flowers on elms, red or swamp maples, and hazel bushes, and on that first day of spring he "remarked that the mountains were covered in several places with Sanguinaria, Claytonia, and Erythronium with spotted leaves." Two days later he "remarked the Salix capreoides in flower on the banks of streams and very cool places," and he closes the month's record with the abrupt note: "The 31st arrived at Colonel Avery's and slept at Morganton or Burke Court House." He was across the mountains and near the end of his last journey in this country.

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